Air Quality Permitting
Statement of Basis

December 19, 2007

Tier II Operating Permit and Permit to Construct
No. T2-060033

Micron Technology, Inc., Boise

Facility ID No. 001-00044

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Proposed for Public Comment

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Acronyms, Units, and Chemical Nomenclature

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
Btu	British thermal unit
CFR	Code of Federal Regulations
CI	compression ignition
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EPA	Environmental Protection Agency
FEC	facility emissions cap
gpm	gallons per minute
gr	grain (1 lb = 7,000 grains)
HAPs	Hazardous Air Pollutants
HCl	hydrochloric acid
HF	hydrofluoric acid
hp	horsepower
ICE	internal combustion engine
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pound per hour
m	meter(s)
MACT	Maximum Available Control Technology
MMBtu	Million British thermal units
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O_3	ozone
PM	Particulate Matter
PM_{10}	Particulate Matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTE	Potential to Emit
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	synthetic minor
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/yr	Tons per year
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01 Sections 201 and 404.04, *Rules for the Control of Air Pollution in Idaho* (*Rules*) for Permits to Construct and Tier II operating permits.

2. FACILITY DESCRIPTION

Micron Technology, Inc. (MTI) manufactures semiconductor devices (also called chips or die) on silicon wafers. A description of the manufacturing processes is outlined in detail below. Manufacturing and support operations are currently conducted in varying degrees in the four fabrication areas at MTI: two production fabrication areas (Fab 1A and Fab 1B), one production support area (Fab 1C), and a research and development (R&D) area (Fab 4). Once fabrication is complete, chips are assembled and tested.

The facility must constantly adapt to changing product mix, architecture, and functionality. The nature and rapid pace of constant technological change affects the type, number, and configuration of equipment (also known as "tools" in the industry) required to fabricate chips or die. The facility currently performs the basic processes described in detail below: cleaning, diffusion, photolithography, wet etch, dry etch, diffusion, implant, metallization, test, probe, assembly, and mask manufacturing. As needs change, the facility may introduce new activities, or phase out listed activities.

2.1 MANUFACTURING

2.1.1 Fabrication

The wafer fabrication process consists of several steps: cleaning, diffusion, photolithography, etch, doping, metallization, packaging, and other finishing steps including testing.

2.1.1.1 Cleaning

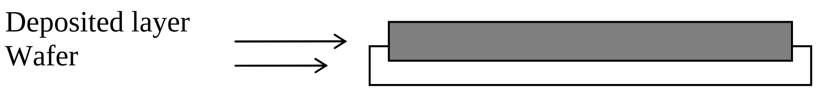
Silicon wafers are cleaned to remove particles and contaminants such as dust. Aqueous acid or acid mixtures are the most commonly used cleaning solutions. Use of acids is generally necessary because of the solubility characteristics of silicon, silicon oxide, and common contaminants. A variety of acids may be used depending on the nature of the material to be removed.

2.1.1.2 Diffusion

The next step in the process depends on the type (i.e., imager, flash, DRAM), of integrated circuit device being produced, but commonly involves the diffusion or growth of a layer or layers of silicon dioxide, silicon nitride, or polycrystalline silicon (see Figure 2-1). For example, an initial layer of silicon dioxide with the subsequent deposition of a silicon nitride layer is commonly applied to metal oxide silicon devices. Diffusion processes can be conducted at atmospheric pressure or in a vacuum chamber and are typically conducted at temperatures between 400 and 1200°C. Chemicals and gases necessary to obtain the desired effect are flowed for a limited time into the chambers where a reaction takes place, depositing a layer of the element or compound on the surface of the wafer. Wafer residence times in the chambers can range from several minutes to twenty-four hours. Several products containing VOCs may be used in the diffusion step depending on the desired composition of the layer. As gases react in the diffusion process, a small amount of particulate matter may be produced and emitted.

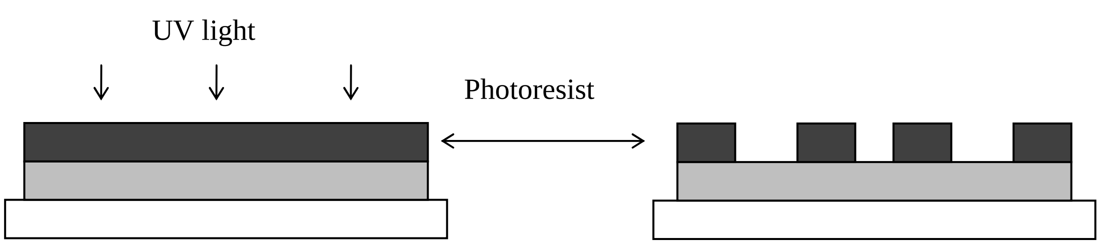
FIGURE 2-1

SCHEMATIC REPRESENTATION OF A WAFER AFTER DIFFUSION



2.1.1.3 Photolithography
The wafer then proceeds to the photo process. Vapor priming occurs first to remove any moisture present on the surface of the wafer to prepare it for optimum photoresist adhesion. The wafer continues on to coat tracks where it is coated with a photoresist, a photosensitive emulsion, followed by a rinse to remove excess photoresist from the edges and backside of the wafer. The wafer is next exposed to ultraviolet light using glass photomasks that allow the light to strike only selected areas and depolymerize the photoresist in these areas (see Figure 2-2). After exposure to ultraviolet light, exposed resist is removed from the wafer on develop tracks and rinsed off with deionized (DI) water. Some wafers may be further baked to harden the photo mask layer. This hard bake process, designed to cross-link and harden the polymers in the photoresist, occurs after the volatile constituents have been driven off. Photo allows subsequent processes to affect only the exposed portions of the wafer. Wafer residence times during chemical application in the photo process can vary from several seconds to ten or fifteen minutes.

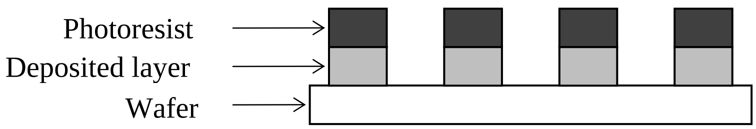
FIGURE 2-2
SCHEMATIC REPRESENTATION OF A WAFER DURING AND AFTER PHOTO



2.1.1.4 Etch
Etching of the wafer is then conducted to selectively remove deposited layers not protected by the photoresist material (see Figure 2-3). Either dry or wet etch processes may be used depending on the type of layer being removed. Dry etch uses a high energy plasma to remove the target layer. Process gases are ionized under vacuum pressure to form plasmas capable of etching specific layers. Wet etch may also be used to remove specific layers from the wafer. Some wet etch processes, however, also perform cleaning functions and prepare the wafer for subsequent processing. Wet etch is generally conducted at atmospheric pressure. Both etch processes may be conducted at ambient temperature or elevated temperatures (400°C or higher). Chemicals and gases used in both etch processes may be used in varying quantities depending on the specific objective of the etch being conducted. Wafer etching can be conducted for anywhere from two minutes to more than two hours. Some of the VOC-containing material used in etch processes may be discharged to either the hazardous waste or industrial wastewater collection systems.

FIGURE 2-3

SCHEMATIC REPRESENTATION OF A WAFER AFTER ETCHING

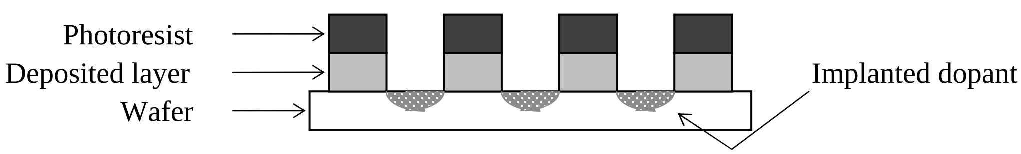


2.1.1.5 Doping (Diffusion and Implant)

Following etch the wafer moves on to a process where dopants are added to the wafer or layers. Dopants are impurities such as boron, phosphorus, or arsenic. Adding small quantities of these impurities to the wafer substrate alters its electrical properties. Implant and diffusion are two methods currently used to add dopants. During implant a chemical is ionized and accelerated in a beam to velocities approaching the speed of light. Scanning the beam across the wafer surface implants the energized ions into the wafer. A subsequent heating step, termed annealing, is necessary to make the implanted dopants electrically active. Diffusion is a vapor phase process in which the dopant, in the form of a gas, is injected into a furnace containing the wafers. The gaseous compound breaks down into its elemental constituents on the hot wafer surface. Continued heating of the wafer allows diffusion of the dopant into the surface at controlled depths to form the electrical pathways within the wafer (see Figure 2-4). Solid forms of the dopant may also be used. Implant is currently conducted in Fab 1C only.

FIGURE 2-4

SCHEMATIC REPRESENTATION OF A WAFER AFTER IMPLANT



2.1.1.6 Metallization

Metallization is a process that can be used to add metal layers to a wafer. Sputtering and vacuum deposition are forms of metallization that may be used to deposit a layer of metal on the wafer surface. In the sputtering process the source metal and the target wafer are electrically charged, as the cathode and anode, respectively, in a partially evacuated chamber. The electric field ionizes the gas in the chamber and these ions bombard the source metal cathode, ejecting metal which deposits on the wafer surface. In the vacuum deposition process the source metal is heated in a high vacuum chamber by resistance or electron beam heating to the vaporization temperature. The vaporized metal condenses on the surface of the silicon wafer. Some VOCs may be used in the diffusion process, but are generally not used in the implant or metallization processes.

2.1.1.7 Wafer-Level Packaging

Rather than being assembled into protective packages as described in Section 2.2.3, some semiconductor chips are processed further at the wafer level. Wafer level packaging consists of extending the wafer fabrication process to include device inter-connection and device protection processes.

2.1.1.8 Other Wafer Fabrication Steps

The wafer is then rinsed in an acid or solvent solution to remove the remainder of the hardened photoresist material. A second oxide layer is grown on the wafer and the process is repeated. This photolithographic-etching-implant-oxide process sequence may occur a number of times depending upon the application of the semiconductor. During these processes the wafer may be cleaned many times in acid solutions followed by DI water rinses and solvent drying. This is necessary to maintain wafer cleanliness. The rinsing and drying steps may involve the use of a VOC-containing material. The wafer fabrication phase of manufacture ends with an electrical test (probe). Each die on the wafer is probed to determine whether it functions correctly. Defective die are marked to indicate they should be discarded. A computer-controlled testing tool quickly tests each circuit.

2.1.2 Fabrication of Masks

As noted above, the photo process employs photomasks. Photomasks (or masks), are very flat pieces of quartz or glass with a layer of chrome on one side. Circuit designs are etched into the chrome. The manufacturing process to produce a mask is similar to, but much simpler than the process to make a silicon-based electrical device. Production of silicon-based devices includes many steps and can take up to several months to manufacture; whereas, a mask requires relatively few steps and only about a week to manufacture. Masks are produced in the “Mask Shop” (Building 80), located in the northeast portion of the site.

The major steps involved in producing a mask are:

- Lithography
- Develop
- Etch
- Strip

These steps are very similar to those discussed above and utilize similar chemicals. The mask manufacturing process has lower emissions of VOCs than the wafer manufacturing process.
In May of 2006, the Mask Shop changed ownership. MTI entered into a joint venture with another company (Photronics) to produce masks. MTI is the majority owner of the new company called MP Mask LLC. MTI has determined that the Mask Shop is part of the Facility as it is under common control, located on contiguous property, and classified under the same Standard Industrial Classification as the Facility. IDAPA 58.01.01.006.36. Therefore, the Mask Shop is included in this permit analysis.

2.1.3 Assembly

After the fabrication processes are completed, most semiconductor chips are assembled into protective packages. The wafers are first mounted on tape in a metal frame where the wafer is sectioned by a wafer saw to separate the individual chips or die. Die are picked off the tape and attached to the bonding pad of a leadframe. Die attach cure ovens heat treat the die/leadframe assembly for several hours. The die is then connected to the legs of the leadframe by fine bonding wire. A protective coating is applied to the die and hardened in die coat cure ovens. The entire die is then encapsulated with a protective molding compound. The leadframe strip is trimmed and individual die leads formed. The legs of individual die packages are then plated to provide reliable electrical contacts. Individual die may then be sold as die or assembled further into memory modules. Several VOC-containing materials are used in the assembly process.

2.1.4 Test

After assembly or wafer level packaging, the complete die are run through a series of tests for classification and final checking. There are several different tests run during this phase. Tests are conducted at varying temperatures to check for early failure of the die and to verify the speed of each die. A final visual check of the die is conducted before they are packaged and shipped. No pollutants are currently emitted by the testing process.

2.2 SUPPORT OPERATIONS

Numerous operations are conducted at the MTI Facility in support of the manufacturing process. These include, but are not limited to:

- natural gas boilers used to supply steam for general heating and humidification;
- cooling towers used to dissipate heat from non-contact cooling water;
- an industrial wastewater treatment plant used to treat manufacturing wastewater to levels suitable for either land application or discharge to a publicly owned treatment works;
- temporary storage of solid and liquid hazardous waste and secondary materials generated at MTI pending shipment to a licensed off-site treatment, storage, and disposal facility or for lawful reuse or other recycling;
- storage and dispensing of unleaded gasoline and diesel fuels;
- painting and welding in support of new construction and maintenance of existing equipment and facilities;
- maintenance of surfaces in production areas by general cleaning activities; and
- emergency equipment.

MTI also assembles printed circuit boards, assembles custom test equipment (e.g., Ambyx ovens), and provides finished product packaging, as well as other support operations as part of its Systems Integration Group (SIG).

3. FACILITY / AREA CLASSIFICATION

MTI is classified as a Tier I major facility for purposes of the Title V program as defined under IDAPA 58.01.01.008.10 because the potential emissions of several criteria pollutants exceed 100 tons per year. The AIRS classification is A.

MTI is not a major facility for purposes of the PSD/NSR program as defined under IDAPA 58.01.01.205.01 (40 CFR 52.21(b)). The MTI facility includes a listed source according to the definition of “major stationary source” at 52.21(b)(i)(a). MTI contains the listed source “fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input”, which means the major source threshold for the boilers is 100 T/yr. The emissions from the natural gas boilers are limited to less than 100 T/yr of any regulated pollutant so they are below the PSD threshold (NOx and CO emissions from the boilers are limited in the permit to 75 T/yr). The 100 T/yr PSD threshold applies only to the fossil fuel boilers because the primary activity at MTI is semiconductor manufacturing (SIC code 3674). The PSD threshold for semiconductor manufacturing operations is 250 T/yr. This determination was made by reviewing the New Source Review Workshop Manual, October 1990, and EPA NSR policy and guidance documents. According to the New Source Review Workshop Manual, page A.23, a situation frequently occurs in which an emissions unit that is included in the 28 listed source categories (and so is subject to a 100 T/yr threshold), is located within a parent source whose primary activity is not on the list (and is therefore subject to a 250 T/yr threshold). A source which, when considered alone, would be major cannot “hide” within a different and less restrictive source category in order to escape applicability.

The facility is located within AQCR 64 and UTM zone 11. The facility is located in Ada County which is designated as attainment for PM_{10} and CO and unclassifiable for all other regulated criteria pollutants (NO_X, SO_2, lead, and ozone).

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant at MTI. This required information is entered into the EPA AIRS database.

4. APPLICATION SCOPE

The purposes of the application are to:

- Update the Tier II application required under Tier I operating permit condition 4.10.
- Update the emission inventory,
- Refine proposed Facility emission caps (FECs),
- Propose permit terms,
- Authorize potential minor modifications to the Facility, including potential construction of additional manufacturing capacity, that may increase emissions under the proposed FEC,
- Incorporate terms of the Third Amended Consent Order, and
- Develop an alternative tracking system for substances listed at IDAPA 58.01.01.585 and 586.

MTI seeks the flexibility to construct minor modifications and to operate the Facility within the FEC limitations subject to a mutually agreeable compliance demonstration method.

4.1 Application Chronology

October 7, 2002	Third Amended Consent Order issued that required MTI to submit a facility Tier II operating permit application within 180 days.
March 14, 2003	DEQ received a Tier II permit application from MTI.
June 2, 2003	DEQ determined the application complete

There was a break in activity while MTI staff, DEQ staff, other industry representatives, and environmental groups participated in a negotiated rulemaking to develop the facility emission cap (FEC) rule during 2004 and 2005.

November 17, 2005	Board of Environmental Quality approved the proposed FEC rule.
April 11, 2006	The FEC rule became final upon the adjournment of the legislature.
June 22, 2006	DEQ received updated Tier II permit application from MTI.
July 21, 2006	DEQ determined the updated application complete.
December 15, 2006	MTI asked DEQ to delay issuance of the operating permit until after a permit to construct for a server building with additional generators is issued.
March 16, 2007	MTI notified DEQ that the server building project was cancelled so they would not be pursuing a permit to construct.
June 29, 2007	DEQ issued draft permit to MTI for review.
August 17, 2007	MTI submitted comments on draft permit and statement of basis.
August 21, 2007	DEQ met with MTI to discuss the draft permit.
October 12, 2007	MTI submitted additional comments on the draft permit.

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this Tier II.

5.1 Equipment Listing

The semiconductor manufacturing process consists of hundreds of different tools that are often updated or replaced as technology improves. Due to these factors, the individual tools are not listed in the permit. The emissions are estimated using an overall plant-wide mass balance so the exact number and type of tools used is not needed to determine compliance. MTI does use several air pollution control devices and their control efficiency is accounted for in the mass balance. Air pollution control devices currently in place are listed in Table 5.1. Additional devices may be brought on line, and some removed, as the facility changes within the FEC limits of the permit.

Table 5.1. Air pollution control equipment

Source	Associated Building	Stack/ Vent	Source ID
EU4 -- Manufacturing Processes			
ACID SCRUBBER	1	1	1-FS-01
ACID SCRUBBER	1	2	1-FS-02
ACID SCRUBBER	1	3	1-FS-03
ACID SCRUBBER	1X	1	1-FS-101
ACID SCRUBBER	1X	2	1-FS-102
ACID SCRUBBER	1X	3	1-FS-103
ACID SCRUBBER	1X	4	1-FS-104
AMMONIA SCRUBBER	1X	105	1-AMS-105
EMERGENCY SCRUBBER	3	1	3-GBFS-01
ACID SCRUBBER	4	1	4-FS-01
ACID SCRUBBER	4	2	4-FS-02
ACID SCRUBBER	5	1	5-FS-01
ACID SCRUBBER	5	2	5-FS-02
ACID SCRUBBER	5	3	5-FS-03
ACID SCRUBBER	15	1	15-FS-01
ACID SCRUBBER	15	2	15-FS-02
ACID SCRUBBER	15	3	15-FS-03
ACID SCRUBBER	15	4	15-FS-04
AMMONIA SCRUBBER	15	5	15-AMS-05
AMMONIA SCRUBBER	15	6	15-AMS-06
ACID SCRUBBER	16	1	16-FS-01
ACID SCRUBBER	16	2	16-FS-02
AMMONIA SCRUBBER	24	1	24-AMS-01
AMMONIA SCRUBBER	24	2	24-AMS-02
ACID SCRUBBER	24	3	24-FS-03
ACID SCRUBBER	24	4	24-FS-04
ACID SCRUBBER	24	5	24-FS-05
ACID SCRUBBER	24	6	24-FS-06
ACID SCRUBBER	24	7	24-FS-07
AMMONIA SCRUBBER	24	8	24-AMS-08
ACID SCRUBBER	24	9	24-FS-09
ACID SCRUBBER	24	10	24-FS-10
ACID SCRUBBER	24	11	24-FS-11
AMMONIA SCRUBBER	24	12	24-AMS-12
AMMONIA SCRUBBER	24	13	24-AMS-13
ACID SCRUBBER	26	1	26-FS-01
ACID SCRUBBER	26	2	26-FS-02
AMMONIA SCRUBBER	24D	1	24D-AMS-01
MULTIPURPOSE SCRUBBER	24D	1	24D-MPS-01
ACID SCRUBBER	24D	1	24D-FS-01
ACID SCRUBBER	24D	2	24D-FS-02

Source	Associated Building	Stack/ Vent	Source ID
ACID SCRUBBER	24D	3	24D-FS-03
ACID SCRUBBER	24D	4	24D-FS-04
ACID SCRUBBER	80	1	80-FS-01
ACID SCRUBBER	80	2	80-FS-02
EMERGENCY DRY SCRUBBER	10	1	10-FS-01
EMERGENCY DRY SCRUBBER	10	2	10-FS-02
VOC Abatement Devices			
VOC Abatement Device	1X	1	1X-VOC
VOC Abatement Device	2	1	2-VOC
VOC Abatement Device	15	1	15-VOC
VOC Abatement Device	24	1	24-VOC
VOC Abatement Device	24C	1	24C-VOC
VOC Abatement Device	24D	1	24D-VOC
VOC Abatement Device	24E	1	24E-VOC
VOC Abatement Device	80	1	80-VOC

MTI uses natural gas boilers to supply steam for general heating and humidification of the plant. The existing and proposed boilers are listed in Table 5.1.

Table 5.2 Boilers

Boiler	Capacity (MMBtu/hr)	Associated Building	Date Installed/Last Modified	Subject to NSPS Subpart Dc (Y/N)
Existing Boilers				
EU1-0401	12.56	4	7/1/84	N
EU1-0402	12.56	4	7/1/84	N
EU1-0403	25.11	4	7/1/84	N
EU1-0404	25.11	4	4/29/88	N
EU1-0405	29.30	4	11/10/88	N
EU1-0406	29.30	4	8/10/90	Y
EU1-0407	25.11	4	8/14/95	Y
EU1-2501	25.11	25	8/1/94	Y
EU1-2502	12.56	25	12/14/93	Y
EU1-2503	12.56	25	12/14/93	Y
EU1-2504	25.11	25	12/20/93	Y
EU1-2505	25.11	25	1/26/95	Y
EU1-2506	25.11	25	11/1/95	Y
EU1-2507	25.11	25	11/1/95	Y
EU1-2508	25.11	25	4/21/97	Y
EU1-2509	25.11	25	4/21/97	Y
EU1-3201	1.125	32	N/A[a]	N
EU1-8001	<10	80	N/A	N
EU1-8002	<10	80	N/A	N
EU1-8003	<10	80	N/A	N
EU1-8004	<10	80	N/A	N
EU1-8005	<10	80	N/A	N
EU1-8006	<10	80	N/A	N
Total existing capacity	<420			
Proposed boilers				
	>10, <30		Future	Y
	>10, <30		Future	Y
	>10, <30		Future	Y
	>10, <30		Future	Y
	>10, <30		Future	Y

Proposed boiler capacity	150			
Total existing and proposed	<570			

(a) N/A stands for "not applicable". The date of installation is not relevant for boilers with a heat input capacity less than 10 MMBtu/hr because they fall out of NSPS applicability based on size alone.

MTI has 17 existing emergency generators and a firewater pump. The engine sizes range form 339 hp to 1,851 hp. MTI proposes to install up to nine additional 1820 hp emergency generators. The existing generators burn primarily no. 2 diesel fuel and no. 1 diesel fuel is sometimes used in the winter to prevent gelling. Future generators may run on natural gas.

MTI has 22 existing non-contact cooling tower cells that are used to dissipate excess heat. No chromium-based water treatment chemicals are used in the circulating water. Again, all of the pollution control devices, boilers, and cooling towers may be supplemented, modified, or removed consistent with the permit terms.

5.2 Emissions Inventory

This section includes a summary of estimated emissions from the MTI facility. A more detailed emissions inventory is included in the application. As part of the permit development, DEQ reviewed MTI's 2004 toxic release inventory report to verify estimated emissions reported to EPA are consistent with those in the application. Emissions estimates were consistent. In addition, DEQ reviewed EPA's compliance sector notebook titled "Profile of the Electronics and Computer Industry" (EPA 310-R-95-002, September 1995). Typical pollutants for the semiconductor manufacturing industry that were identified in the sector notebook are addressed in MTI's application and the permit.

Criteria Pollutant and HAP Emissions

As part of the Tier II permit MTI requested a facility emissions cap (FEC) on criteria and hazardous air pollutant emissions. The proposed FEC emissions limits are provided in Table 5.2.1.

Table 5.2.1. Criteria and Hazardous Pollutant Proposed FEC

	NOx (T/yr)	CO (T/yr)	SO2 (T/yr)	VOC (T/yr)	PM10 (T/yr)	Pb (T/yr)	Single HAP	All HAP
Baseline Actual Emissions	39	36	1	98	33	<0.02	5	15
Operational Variability Component	39	37	1	23	14	0.02	NA	NA
Proposed Growth Component	48	31	5	55	11	0.02	<5	<10
Total Proposed FEC	126	104	7	176	59	0.06	<10	<25
Emissions rounded up to the nearest whole ton per year, except Pb.								

Combustion emissions result from operation of natural gas-fired boilers, diesel-fueled emergency generators, VOC abatement devices, and insignificantly from process safety equipment. The process safety equipment includes small oxidizers that burn excess pyrophoric gas and other flammable gases before they reach the atmosphere. The diesel generators are routinely operated for testing and maintenance (typically about 12 hours per year per generator). All boilers are used, but due to operational constraints, the average annual utilization is only 36% of capacity. The VOC abatement units and process safety equipment are small sources of combustion emissions because the gas firing rates are low.

DEQ is requiring that MTI use an SO_2 emissions factor for natural gas combustion of 2.3 lb/MMscf, rather than the standard AP-42 emissions factor of 0.6 lb/MMscf. This is because sulfur monitoring at natural gas pipeline stations in the northwest U.S. have found the sulfur content is generally higher than in the natural gas from the central and eastern U.S. upon which the AP-42 emissions factors were developed. The natural gas produced in Canada can have a particularly high sulfur concentration. The 2.3 lb/MMscf emission factor is based on sulfur data from Duke Energy that shows the average annual sulfur content of pipeline natural gas is approximately 0.8 gr S/100 scf (8,000 gr/10^6 scf).

The NOx and CO emissions factors for boilers in the size range 10 MMBtu/hr to 30 MMBtu/hr are from Sellers Engineering Company.

> NOx = 0.072 lb/MMBtu * 1050 Btu/scf = 75.6 lb/MMscf.
> CO = 0.076 lb/MMBtu * 1050 Btu/scf = 79.8 lb/MMscf

The NOx and CO emissions factors for boilers less than 10 MMBtu/hr are from AP-42. The PM_{10} and VOC emissions factors for all boilers are from AP-42, Section 1.4, dated July 1998.

Toxic air pollutant emissions

MTI assessed compliance with Section 210 by considering projected facility-wide increases in process emissions of substances listed at IDAPA 58.01.01.585 and 586. The facility-wide analysis is far more rigorous than that required under IDAPA 58.01.01.210, which requires only that emission increases associated with individual changes be compared to the criteria at IDAPA 58.01.01.585 and 586.

To demonstrate compliance with the toxic emissions standards, MTI first estimated actual process-generated emissions of substances listed at IDAPA 58.01.01.585 and 586 for four recent calendar years (2001-2004). Potential increases were estimated to be 80% above actual emissions. Table 5.2.2 presents an estimate of the increase in emissions of such substances emitted during the four-year period, ranked by the percentage of actual annual emissions versus the corresponding EL. A complete list of substances listed at Sections 585 and 586 that MTI emits is provided in the application at Appendix H. As can be seen from the table, the projected increase in emissions for each pollutant is below the acceptable ambient concentrations in IDAPA 58.01.01.585 and 586.

TABLE 5.2.2 FACILITY-WIDE INCREASES[1] OF EMISSIONS OF SUBSTANCES LISTED AT IDAPA 58.01.01.585 AND 586

Material	80% of Current Consumption (lb/yr)	Emission Rate (lb/hr)	IDAPA EL (lb/hr)	Percent of EL	Max Predicted Impact (μg/m³)	IDAPA AAC/AACC (μg/m³)	Over AAC/ AACC ?	Percent of AAC/ AACC
Silica – Quartz	2688	0.31	0.0067	4580	4.01	5	No	80
Silica Amorphous (Fused)	1706	0.19	0.0067	2907	2.54	5	No	51
Hydrochloric Acid	6316	0.72	0.05	1442	9.42	375	No	3
Ammonia	114430	13.06	1.2	1089	170.63	900	No	19
Potassium Hydroxide	8017	0.92	0.133	688	11.95	100	No	12
Methylene Bisphenyl Isocyanate	150	0.02	0.003	569	0.22	2.5	No	9
Hydrofluoric Acid (Fluorides)	8032	0.92	0.167	549	12.0	125	No	10
Chlorine	5487	0.63	0.2	313	8.2	150	No	5
1,2-Ethanediamine, N-(2-Aminoethyl)-	6909	0.79	0.267	295	10.30	200	No	5
Formaldehyde	13	1.5E-03	0.00051	288	0.005	0.077	No	7
Hydrogen Peroxide	2480	0.28	0.1	283	3.70	75	No	5
Sodium Metabisulfite	7800	0.89	0.333	267	11.63	250	No	5
Sodium Hydroxide	2435	0.28	0.133	209	3.63	100	No	4
Methylene Chloride	28	3.2E-03	0.0016	203	0.01	0.24	No	5
Crystalline Silica, Cristobalite	55	6.3E-03	0.0033	192	0.083	2.5	No	3
Chloroform	4	4.8E-04	0.00028	172	0.00	0.043	No	4
Sulfuric Acid	845	0.10	0.067	144	1.26	50	No	3
Hydrogen Bromide	754	0.09	0.0667	129	1.12	500	No	0.2

[1] Based upon the VOC FEC, MTI assumed manufacturing process emissions of substances listed at IDAPA 58.01.01.585 and 586 would increase approximately 80 percent.

5.3 Modeling

A detailed modeling analysis that demonstrates compliance with the NAAQS is found in Appendix C.

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this Tier II.

IDAPA 58.01.01.400...............................Procedures and Requirements for Tier II Operating Permits

The consent order dated October 7, 2002, states in condition 16, "MTI shall submit a facility-wide Tier II operating permit application within 180 days of the effective date of this Third Amended Consent Order. The application shall comply with IDAPA 58.01.01.402, and include all application information required by IDAPA 58.01.01.202."

As noted in the application chronology section of this statement of basis, the initial Tier II application was received March 14, 2003. MTI submitted an updated application, after the FEC rule was approved by the Legislature, on June 22, 2006.

The application demonstrates that MTI is in compliance with all applicable state and federal emissions standards and that the source does not cause a violation of any ambient air quality standard.

IDAPA 58.01.01.210...............................Demonstration of Preconstruction Compliance with Toxic Standards

MTI has demonstrated preconstruction compliance for all TAPs identified in the permit application. Future toxic air pollutant emissions from the production processes were estimated by assuming they would increase 80% above current average emissions rates. The estimated emissions rate of 18 toxics exceeded the screening emissions levels in IDAPA 58.01.01.585-586 so MTI conducted modeling to demonstrate that the controlled emissions rate will not cause an exceedance of the AAC or AACC. Therefore, MTI has demonstrated preconstruction compliance with the toxic air pollutant standards in accordance with IDAPA 58.01.01.210.08.

According to IDAPA 58.01.01.210.08.c, DEQ must include an emissions limit in the permit when a controlled emissions rate is used to demonstrate compliance with the toxics standards. The permit limits emissions from each TAP to 80% of the respective AAC or AACC by using the conservative modeling analysis that was conducted as part of the permit application. MTI's emissions may exceed the emissions rate that is equivalent to 80% of the AAC or AACC, but only if they conduct a refined modeling analysis that demonstrates the ambient concentration resulting from the increased emissions rate is still below the AAC or AACC.

Dustin Holloway, Micron Environmental Engineer, requested in a phone conversation on March 16, 2007, that the only pollutants for which a baseline emissions rate be included in the permit are silica-quartz and silica-amorphous. The other toxic pollutants will not have a baseline emissions rate listed in the permit. Therefore, M_u (baseline hourly emissions rate) will be zero for all pollutants except silica-quartz and silica-amorphous in equation 5.1 of the permit.

40 CFR 60, Subpart Dc…………………Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

This subpart applies to each steam generating unit for which construction commenced after June 9, 1989, and has a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than 10 MMBtu/hr. Eleven of the existing boilers are NSPS Subpart Dc affected units. MTI has elected to record fuel use on a calendar month basis in accordance with the alternative fuel monitoring requirement in 40 CFR 60.48c(g)(3). MTI proposes to install additional boilers with a heat input capacity between 10 and 29 MMBtu/hr that will be subject to the Subpart. The permit includes specific conditions for boilers with input capacity greater than 10MMBtu/hr and less than 30 MMBtu/hr.

40 CFR 60, Subpart IIII…………………Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

A portion of Subpart IIII is provided here to assist with applicability determinations.

§ 60.4200 Am I subject to this subpart?

(a) The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (3) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

(1) Only applicable to Manufacturers

(2) Owners and operators of stationary CI ICE that commence construction after July 11, 2005 where the stationary CI ICE are:

(i) Manufactured after April 1, 2006 and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

(3) Owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005.

(b) The provisions of this subpart are not applicable to stationary CI ICE being tested at a stationary CI ICE test cell/stand.

(c) If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart applicable to area sources.

(d) Stationary CI ICE may be eligible for exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C (or the exemptions described in 40 CFR part 89, subpart J and 40 CFR part 94, subpart J, for engines that would need to be certified to standards in those parts), except that owners and operators, as well as manufacturers, may be eligible to request an exemption for national security.

§ 60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of pre-2007 model year emergency stationary CI ICE with a displacement of less than 10 liters per cylinder that are not fire pump engines must comply with the emission standards in table 1 to this subpart. Owners and operators of pre-2007 model year non-emergency stationary CI ICE with a displacement of greater than or equal to 10 liters per cylinder and less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards in 40 CFR 94.8(a)(1).

(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

(c) Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants.

(d) Owners and operators of emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder must meet the requirements in paragraphs (d)(1) and (2) of this section.

(1) Reduce NO_x emissions by 90 percent or more, or limit the emissions of NO_x in the stationary CI internal combustion engine exhaust to 1.6 grams per KW-hour (1.2 grams per HP-hour).

(2) Reduce PM emissions by 60 percent or more, or limit the emissions of PM in the stationary CI internal combustion engine exhaust to 0.15 g/KW-hr (0.11 g/HP-hr).

40 CFR 63, Subpart BBBBB ....National Emissions Standards for Hazardous Air Pollutants for Semiconductor Manufacturing

In accordance with 40 CFR 63.7181, "(a) You are subject to this subpart if you own or operate a semiconductor manufacturing process unit that is a major source of hazardous air pollutants (HAP) emissions or that is located at, or is part of, a major source of HAP emissions. (b) A major source of HAP emissions is any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit, considering controls, in the aggregate, any single HAP at a rate of 10 tons per year (tpy) or more or any combination of HAP at a rate of 25 tpy or more."

The MTI facility is not subject to this subpart because it is not a major source of hazardous air pollutant emissions. The permit contains a limit to prevent emissions from exceeding 10 tons per year of any single HAP and 25 tons per year of any combination of HAPs. DEQ summed all estimated hazardous air pollutant emissions listed in Appendix H of the application and found total controlled emissions to be 18.3 T/yr.

5.5 Fee Review

A Tier II operating permit processing fee must be paid to DEQ in accordance with IDAPA 58.01.01.407 by the permittee receiving a Tier II operating permit. MTI's fee is $10,000 because it is in the category of stationary source or facility with permitted emissions of 100 tons or more per year. As seen in Table 5.1, the total permitted emissions from MTI are greater than 100 tons per year. The processing fee is payable upon receipt of an assessment from DEQ at the time of permit issuance.

TABLE 5.1 TIER II PROCESSING FEE SUMMARY

Emissions Inventory	
Pollutant	**Permitted Emissions**
NO_X	126.0
SO_2	7.0
CO	104.0
PM_{10}	59.0
VOC	176.0
TAPS/HAPS	25.0
Total:	497.0
Fee Due	**$ 10,000.00**

The MTI facility is Tier I source and is subject to annual Tier I registration fees.

5.6 Regional Review of Draft Permit

The draft permit was made available for Boise regional office review on September 22, 2006 and no comments were received.

5.7 Facility Review of Draft Permit

The draft permit was provided to Micron Technology for review on June 29, 2007. DEQ provided MTI an extension of time to August 17th to provide comments. MTI provided comments on August 17, 2007. DEQ met with MTI on August 21, 2007, to discuss the comments and MTI provided additional comments on October 12, 2007.

6. PERMIT CONDITIONS

This section summarizes the requirements of the permit and explains the compliance demonstrations.

6.1 Facility Emissions Cap

As provided by the new FEC rule, MTI proposed to establish FECs for criteria air pollutants that will constitute preconstruction approval and allow flexibility to reconfigure and install new fabrication tools, related pollution control equipment, new boilers, and emergency generators without performing individual PTC applicability determinations for each project. The FEC rule describes three potential components of a FEC: 1) baseline actual emissions, 2) an operational variability component and 3) an optional growth component.

Proposed Facility Emission Cap

Table 6.1.1 summarizes MTI's proposed baseline, growth, and operational variability components for the FEC for each criteria pollutant from all sources at the facility. Details of the calculation of the growth component are provided in the application. The proposed conditions presented in Section 6.2 consider appropriate recordkeeping and reporting requirements to ensure compliance with the FEC. In addition, the FEC limits hazardous air pollutant emissions below major source thresholds.

TABLE 6.1.1 CRITERIA POLLUTANT BASELINE EMISSIONS AND PROPOSED FEC

	NOx (T/yr)	CO (T/yr)	SO2 (T/yr)	VOC (T/yr)	PM10 (T/yr)	Pb (T/yr)	Single HAP	All HAP
Baseline Actual Emissions	39	36	1	98	33	<0.02	5	15
Operational Variability Component	39	37	1	23	14	0.02	NA	NA
Proposed Growth Component	48	31	5	55	11	0.02	<5	<10
Total Proposed FEC	126	104	7	176	59	0.06	<10	<25
Emissions rounded up to the nearest whole ton per year, except Pb.								

Baseline Actual Emissions

Combustion emissions result from the operation of natural gas-fired boilers, diesel-fueled emergency generators, VOC abatement devices, and process safety equipment. The diesel generators are routinely operated for testing and maintenance (typically about 12 hours per year per generator). All boilers are used, but due to operational constraints, the average annual utilization is only 36% of capacity. The VOC abatement units and process safety equipment are small sources of combustion emissions because the gas firing rates are very low.

The manufacturing process emits particulate matter and VOCs. In addition, small quantities of particulate matter are emitted by fugitive process sources and cooling towers. The 2003/2004 average facility-wide baseline actual estimated emissions of criteria pollutants are summarized in Table 6.1.1. Details of the baseline actual emission calculations are provided in Appendix G of the permit application.

Operational Variability Component

As defined in the FEC rule, the allowance for operational variability may be up to the significant emission rate minus one ton per year. If the significant emission rate is less than ten tons per year, then DEQ and the applicant must negotiate the operational variability component of the FEC.

MTI has chosen not to request the maximum operational variability for carbon monoxide and sulfur dioxide. MTI has allowed for increased operation of combustion devices beyond the low historic usage rates. MTI proposed a FEC on lead emissions of 120 pounds per year (0.06 T/yr), which is 10 percent of the 1,200 pound per year significant emission rate for lead.

As discussed in the application, the semiconductor manufacturing process is constantly changing, and operational variability is the norm. Consequently, MTI has requested an operational variability component for process changes that could occur even without adding additional equipment.

The proposed operational variability components of the FEC for relevant criteria pollutants are included in Table 6.1.1.

Growth Component

The FEC rule includes a growth component "to allow for potential future business growth or facility changes that may increase emissions." The combined PTC and Tier II permit allows for the installation of eleven additional boilers and nine additional diesel generators. In addition, the permit allows for additional manufacturing capacity and for changes in process technology and chemistry by establishing emission limits that are higher than existing actual emissions. Table 6.1.1 identifies anticipated emission increases attributable to installation of the proposed boilers, generators, and the manufacturing process.

Specific Proposed Conditions

This section identifies appropriate permit conditions relevant to monitoring requirements and operation of emission control devices to demonstrate compliance with the proposed FEC.

Criteria Pollutant Facility Emissions Cap.

The PM_{10}, SO_2, NO_X, CO, VOC, and Pb emissions from the MTI facility shall not exceed any corresponding facility emissions cap (FEC) limits listed in Table 6.2.

TABLE 6.2 FEC EMISSIONS LIMITS

Source DESCRIPTION	PM_{10}	SO_2	NO_X	VOC	CO	Pb	Individual HAPs	Aggregate HAPs
	T/yr	T/yr	T/yr	T/yr	T/yr	lb/yr	T/yr	T/yr
Total Facility Emissions Cap	59	7	126	176	104	0.06	<10	<25

Compliance with the criteria pollutant emissions cap will be determined by determining the rolling 12-month emissions from the boilers and generators based on fuel consumption emissions factors and adding the estimated emissions determined from the cooling towers and manufacturing process using material usage and disposal records with associated control efficiencies from wet scrubbers and VOC abatement units. MTI has a complex chemical data tracking system. Due to the complexity and quantity of data, the process of performing data quality assurance and calculating estimated emissions may take up to eight weeks. Accordingly, MTI's rolling emissions recordkeeping will reflect this interval and the permit provides MTI up to 60 days to complete the quality assurance and emissions calculations.

For facility changes that comply with the terms and conditions of the permit establishing the FEC, but were not included in the estimate of ambient concentration analysis approved for the permit establishing the FEC, the permittee shall review the estimate of ambient concentration analysis. In the event the facility change would result in a significant contribution above the design concentration determined by the estimate of ambient concentration analysis approved for the permit establishing the FEC, but does not cause or significantly contribute to a violation to any ambient air quality standard, the permittee shall provide notice to the Department at least 7 days in advance of the proposed change in accordance with IDAPA 58.01.01.181.01.b. The permittee shall record and maintain documentation of the review on site.

MTI shall report to the Department the rolling 12-month total criteria pollutant and HAP estimated emissions annually in accordance with IDAPA 58.01.01.178.04(b).

HAP Facility Emissions Cap

Hazardous air pollutant (HAP) emissions shall not exceed 10 tons per year for any individual HAP and 25 tons per year for the aggregate of all HAPs. Hazardous air pollutants are those listed in or pursuant to Section 112(b) of the Clean Air Act.

Compliance with the HAP FEC will be determined in the same manner as the criteria pollutant emissions. HAP emissions from the boilers, generators, and manufacturing process will be calculated on a rolling 12-month basis using combustion emissions factors for the boilers and generators and material usage and disposal records with associated scrubber and abatement unit control efficiencies for the manufacturing process, subject to the same 60-day time delay discussed with respect to criteria pollutant calculations. Emissions of HF and HCl can also be formed from the use of other chemicals such as boron trifluoride and these emissions estimates are included in the calculation of total emissions from the facility. In the case of HF emissions the only chemicals returned to vendors are gases. Ammonium fluoride is an aqueous solution. An example calculation of HF emissions from the wet process area where HF is used in liquid baths and HF was formed from a gas that would have had a portion returned to the vendor is as follows:

<u>HF usage emissions</u>
HF emissions (lb/yr) = HF used in the process (pounds/yr) * evaporation rate * scrubber control efficiency

196 lbs HF/yr = 98,051 lbs * 0.1 * (1-0.98)

<u>HF formation emissions</u>
HF emissions (lb/yr) = [chemical usage (lb/yr) – chemical returned to vendor (pounds/yr)]* HF formation ratio * scrubber control efficiency

620 lb/yr = [45,158 lb nitrogen trifluoride/yr – 2,258 lb nitrogen trifluoride returned to vendor] * 0.85 * (1-0.98)

<u>Total HF emissions</u>
HF emissions (T/yr) = [HF usage emissions (lb/yr) + HF formation emissions (lb/yr)] * 1 T/2000 lb

0.41 T/yr HF = [196 lb + 620 lb] * 1/2000

Example annual HAPs calculations for chlorine, hydrochloric acid, hydrofluoric acid, 2-(2-butoxyethoxy)ethanol, and diethanolamine from 2004 are provided in Appendix B.

6.2 Semiconductor Manufacturing Operations

Section 2 of the permit contains conditions specific to the semiconductor manufacturing processes and related pollution control equipment. The requirements of this section of the permit must be followed in order to take credit for the pollution control efficiency in the emissions calculations used to demonstrate compliance with the FEC and the toxic air pollutant emissions calculations in Section 4 of the permit.

Wet Scrubber Permit Conditions

Wet scrubbers are used throughout the facility to control emissions of acids, bases, and water-soluble constituents that are predominantly emitted from the process cleaning steps but also from the etch steps. The recirculating contact liquid in the scrubbers is water with a controlled pH. Water flow rate, pH and media packing depth are directly related to efficiency. Instruments to measure liquid flow rate, pH, and pump operational status are installed and maintained for each scrubber. The liquid pH and pump operational status will be monitored and recorded at least once every 15-minutes. MTI uses a digital monitoring system which takes recordings multiple times per minute. nce per calendar month, MTI will monitor and record the scrubbing liquid flow rate (gpm) to ensure the scrubbers are operating within design parameters to obtain the expected control efficiency.

As an alternative to an operations and maintenance manual for each wet scrubber, MTI proposed to develop a log containing the minimum scrubber liquid recirculation flow rate and pH range required to maintain proper performance for each of the wet scrubbers based on manufacturer's data or applicable engineering data. The log will be continually updated as new scrubbers are added or existing scrubbers are modified. The log will be maintained on site and made available to DEQ representatives upon request.

The permit requires that a performance test be conducted on two wet scrubbers to verify the control efficiency and emissions rate provided by the manufacturer and used in the emissions calculations.

VOC Abatement Devices Permit Conditions

Requirements for operating the VOC abatement devices were established in a consent order. All coat track units at the facility must be controlled by VOC thermal-oxidation units, identified as VOC abatement units. "Coat track" means a semiconductor manufacturing tool that performs a process called coat bake in the photolithography area of the facility. Operating and monitoring requirements for the VOC abatement units are included in the permit.

MTI is required to operate the VOC abatement units according to manufacturers' recommendations as follows:

a) Oxidation temperature shall be 1,350 degrees F or greater.

b) Desorption temperature shall be 340 degrees F or greater.

c) Each unit shall not be operated outside of the manufacturer's design capacity.

MTI must monitor the oxidation and desorption temperatures and record them once per day to demonstrate compliance with the manufacturer's control efficiency. MTI uses a digital monitoring system which takes recordings multiple times per minute.

The permit requires that a performance test be conducted on one VOC abatement unit to verify the VOC control efficiency provided by the manufacturer.

6.3 Pollutants Regulated by IDAPA 58.01.01.585-586

If MTI follows the requirements in the permit for documenting TAP emissions MTI does not need to perform or document a permit exemption for any individual semiconductor process modification that may result in an increase in TAP emissions under IDAPA 58.01.01.223. Compliance with the permit conditions provides a level of tracking TAP emissions that is more stringent than required by IDAPA 58.01.01.223 because the permit limits any additional emissions increases to the AAC or AACC. That is, the permit restricts toxic emissions to the permit exemption levels. This provides reasonable assurance of compliance with IDAPA 58.01.01.161 (toxic contaminants shall not be emitted in quantities that would injure or unreasonably affect human or animal life or vegetation) and the monitoring and recordkeeping burden for MTI is decreased because they do not have to document exemptions for every process change.

MTI has implemented an extensive system for tracking raw materials used at the facility. This system, which is based on MSDSs for each raw material, will enable MTI to track chemicals by CAS number and common name. Some raw materials result in emissions of substances listed at IDAPA 58.01.01.585 and 586.

The permit includes a requirement to monitor and record monthly average hourly toxic air pollutant emissions estimates and a method for demonstrating on-going compliance with TAP standards. The compliance demonstration method included in the permit allows MTI to increase TAP emissions up to the respective AAC or AACC for each TAP by:

1. Using the equations in the permit to determine the hourly emissions rate (E_{ia}) that results in an ambient concentration of 80% of the AAC or AACC. The equations in the permit use a Chi/Q value developed through conservative modeling presented in the permit application that predicts the ambient impact of a one pound per hour emissions rate for either a 24-hour averaging period ($CQ_{24\text{-}hr}$) or an annual averaging period (CQ_{annual}).
2. If the monthly average emissions rate increase (E_i) exceeds the hourly emissions rate from the respective E_{ia} equation that is equal to 80% of the AAC or AACC, then MTI must conduct refined modeling to demonstrate compliance with the respective AAC or AACC. MTI determines the monthly average emissions rate increase (E_i) by: 1) summing the total usage of that pollutant for the month, 2) dividing by the hours of operation, and, 3) if included in the permit, subtracting the maximum hourly emissions rate from four recent calendar years (2001-2004), which is identified as the baseline hourly emission rate (M_u). The baseline hourly emission rate for two pollutants is included in Appendix A of the permit. MTI chose to not include baseline emission rates for other pollutants in the permit so the total emission rate is conservatively assumed to be an increase in emissions.

6.4 Boilers

The facility currently has nearly 420 MMBtu/hr of natural gas-fired boiler capacity among 23 existing boilers. Eleven of the existing boilers are NSPS Subpart Dc affected units and require fuel monitoring. MTI proposes to install up to an additional 150 MMBtu/hr of natural gas-fired boiler capacity under the FEC. If the new boilers are between 10 and 29 MMBtu/hr they will also be NSPS Subpart Dc affected units and MTI will need to comply with the recordkeeping, reporting, and notification requirements of

Subpart Dc. Applicable NSPS requirements are included in the permit. If the new boilers installed at the facility have a rated capacity of 30 MMBtu/hr or greater than MTI must conduct emissions tests in accordance with Subpart Dc.

MTI requested annual emissions limits for CO and NOx on the total boiler capacity at the facility so they can stay below the 100 T/yr major source threshold for designated source categories. The aggregated natural gas-fired boilers at MTI meet the designated facility definition in IDAPA 58.01.01.006.26.v for "fossil-fuel boilers (or combination thereof) of more than two hundred and fifty MMBtu per hour heat input.   The permit limits NOx and CO emissions from the boilers to 75 T/yr, each. To demonstrate compliance with the annual emissions limits MTI monitors the fuel usage and calculates annual estimated emissions using emissions factors. MTI must record the natural gas usage for each boiler on a monthly basis. The natural gas usage data is also used to calculate emissions from the boilers to demonstrate compliance with the FEC and toxic emissions standards in IDAPA 58.01.01.585-586. MTI provided some criteria pollutant emissions factors from the boiler manufacturer and those factors were included in the permit at Appendix B.

6.5 Emergency Generators

The MTI facility currently has 17 existing emergency diesel generators and an emergency firewater pump. These units have rated capacities ranging from 339 to 1,850 horsepower. This equipment usually burns no. 2 diesel fuel oil, but no. 1 diesel can be used during cold weather to prevent the fuel from gelling. Future generators may use natural gas. The permit requires MTI to monitor and record the hours of operation of each generator because that information is used to calculate annual emissions for the FEC compliance demonstration. The hours of operation are multiplied by emissions factors to determine monthly and annual estimated emissions. MTI provided some generator specific emissions factors for the generator engines, and those emissions factors are included in appendix D.

7. PUBLIC COMMENT

In accordance with IDAPA 58.01.01.404.01.c, a public comment period on the proposed Tier II operating permit and application materials will be provided.

8. RECOMMENDATION

Based on the review of the application materials, and all applicable state and federal regulations, staff recommends that DEQ issue a proposed Tier II operating permit to Micron Technology, Inc. An opportunity for public comment on the air quality aspects of the proposed permit shall be provided in accordance with IDAPA 58.01.01.404.01.c.

ZQK Permit No. T2-060033

Appendix A

AIRS Information

T2-060033

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: Micron Technology, Inc.
Facility Location: 8000 South Federal Way, Boise, ID,
AIRS Number: 001-00044

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B		X			B	U
NO_x	A	SM				A	U
CO	A	SM				A	A
PM_{10}	SM					SM	A
PT (Particulate)	SM		X			SM	U
VOC	A	SM				A	U
THAP (Total HAPs)	SM	ND				SM	U
			APPLICABLE SUBPART				
			Dc, IIII				

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] <u>AIRS/AFS Classification Codes</u>:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class “A” is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B

Example HAP Emission Calculation Spreadsheets

T2-060033

Department	Comp Material Name	Component Usage (lbs)	Percent Emitted	Scrubber Efficiency	VOC Removal	Emissions (lbs)		
Misc	2-(2-BUTOXYETHOXY)ETHANOL	1.8	0%		0%	0		
Misc	2-(2-BUTOXYETHOXY)ETHANOL	9.1	0%		0%	0		
Misc	2-(2-BUTOXYETHOXY)ETHANOL	38.1	0%		0%	0		
Wet Process	2-(2-BUTOXYETHOXY)ETHANOL	1756.1	10%		99%	2.6		
Wet Process	2-(2-BUTOXYETHOXY)ETHANOL	2696.9	10%		99%	4.0		
Assembly	2-(2-BUTOXYETHOXY)ETHANOL	0.055	100%		0%	0.06		
Assembly	2-(2-BUTOXYETHOXY)ETHANOL	0.28	100%		0%	0.28		
Assembly	2-(2-BUTOXYETHOXY)ETHANOL	0.783	100%		0%	0.8		
Facilities	2-(2-BUTOXYETHOXY)ETHANOL	1.8	100%		0%	1.8		
Facilities	2-(2-BUTOXYETHOXY)ETHANOL	2.48	100%		0%	2.48		
Facilities	2-(2-BUTOXYETHOXY)ETHANOL	106.1	100%		0%	106.1		
Facilities	2-(2-BUTOXYETHOXY)ETHANOL	128.0	100%		0%	128.0		
Misc Fab Use	2-(2-BUTOXYETHOXY)ETHANOL	0	100%		0%	0		
Misc Fab Use	2-(2-BUTOXYETHOXY)ETHANOL	1.8	100%		0%	1.8		
Misc Fab Use	2-(2-BUTOXYETHOXY)ETHANOL	3.7	100%		0%	3.7		
Misc. Fab Use	2-(2-BUTOXYETHOXY)ETHANOL	5.5	100%		0%	5.5		
Wet Process	2-(2-BUTOXYETHOXY)ETHANOL	8855.3	100%		0%	8855.3	T/yr	
	2-(2-BUTOXYETHOXY)ETHANOL Total					**9112.36**	**4.56**	
Water Treatment	CHLORINE	32550	0%			0		
CVD	CHLORINE	1330	90%			1197		
CVD	CHLORINE	70	90%			63		
CVD	CHLORINE	520	90%			468		
Diffusion	CHLORINE	70	90%			63		
Etch	CHLORINE	2140	90%			1926		
Etch	CHLORINE	2110	90%			1899		
Etch	CHLORINE	1070	90%			963		
Etch	CHLORINE	280	90%			252		
Etch	CHLORINE	30	90%			27		
Etch	CHLORINE	15	90%			13.5		
Misc	CHLORINE	1	90%			0.9		
Water Treatment	CHLORINE	150	90%			135	T/yr	
	CHLORINE Total					**7007.4**	**3.50**	
Assembly	DIETHANOLAMINE	0.0	0%			0		
Facilities	DIETHANOLAMINE	13.9	0%			0		
Photo	DIETHANOLAMINE	624.4	10%					
Lab	DIETHANOLAMINE	0	100%			0		
Photo	DIETHANOLAMINE	4487.5	100%			4487.544634	T/yr	
	DIETHANOLAMINE Total					**4487.54**	**2.24**	
Assembly	HYDROCHLORIC ACID	0.4	0%	95%		0		
Facilities	HYDROCHLORIC ACID	13.3	0%	95%		0		
Misc Fab Use	HYDROCHLORIC ACID	1.6	0%	95%		0.00		
Misc Fab Use	HYDROCHLORIC ACID	1.6	0%	95%		0.00		
Water Treatment	HYDROCHLORIC ACID	75160.4	0%	95%		0.00		
Water Treatment	HYDROCHLORIC ACID	2.2	0%	95%		0.00		
Water Treatment	HYDROCHLORIC ACID	3962.6	0%	95%		0.00		
Assembly	HYDROCHLORIC ACID	54.11	10%	95%		0.27		
Assembly	HYDROCHLORIC ACID	9.5	10%	95%		0.05		
CVD	HYDROCHLORIC ACID	65.3	10%	95%		0.33		
Facilities	HYDROCHLORIC ACID	26.1	10%	95%		0.13		
Facilities	HYDROCHLORIC ACID	60	10%	95%		0.30		
Facilities	HYDROCHLORIC ACID	44.8	10%	95%		0.22		
Lab	HYDROCHLORIC ACID	17.5	10%	95%		0.09		
Lab	HYDROCHLORIC ACID	3.2	10%	95%		0.02		
Misc Fab Use	HYDROCHLORIC ACID	1.6	10%	95%		0.01		
Misc Fab Use	HYDROCHLORIC ACID	25.6	10%	95%		0.13		
Misc Fab Use	HYDROCHLORIC ACID	16	10%	95%		0.08		
Misc Fab Use	HYDROCHLORIC ACID	4.8	10%	95%		0.02		
Photo	HYDROCHLORIC ACID	55	10%	95%		0.28		
Wet Process	HYDROCHLORIC ACID	10210.4	10%	95%		51.05		
Wet Process	HYDROCHLORIC ACID	1668	10%	95%		8.34		
Wet Process	HYDROCHLORIC ACID	6.4	10%	95%		0.03		
Wet Process	HYDROCHLORIC ACID	1060	10%	95%		5.30		
CVD	HYDROCHLORIC ACID	7575	90%	95%		340.88		
CVD	HYDROCHLORIC ACID	18860	90%	95%		848.70		
CVD	HYDROCHLORIC ACID	2255	90%	95%		101.48		
Diffusion	HYDROCHLORIC ACID	1.6	90%	95%		0.07		
Etch	HYDROCHLORIC ACID	60	90%	95%		2.7		
							Emissions from HCl Use	**Emissions including HCl Formed**
Assembly	HYDROCHLORIC ACID	1.6	100%	95%		0.08	**(T/yr)**	**(T/yr)**
	HYDROCHLORIC ACID Total					**1360.54**	**0.680**	**0.901**
Assembly	HYDROFLUORIC ACID	30.83	10%	98%		0.06		
Assembly	HYDROFLUORIC ACID	0	10%	98%		0.00		
Assembly	HYDROFLUORIC ACID	113.8	10%	98%		0.23		
Assembly	HYDROFLUORIC ACID	11.4	10%	98%		0.02		
Assembly	HYDROFLUORIC ACID	5.1	10%	98%		0.01		
CMP	HYDROFLUORIC ACID	40.0	10%	98%		0.08		
Diffusion	HYDROFLUORIC ACID	0.9	10%	98%		0.00		
Etch	HYDROFLUORIC ACID	0.6	10%	98%		0.00		
Etch	HYDROFLUORIC ACID	10.1	10%	98%		0.02		
Facilities	HYDROFLUORIC ACID	429.8	10%	98%		0.86		
Facilities	HYDROFLUORIC ACID	0.6	10%	98%		0.00		
Lab	HYDROFLUORIC ACID	325.5	10%	98%		0.65		
Misc Fab Use	HYDROFLUORIC ACID	109.8	10%	98%		0.22		
Misc Fab Use	HYDROFLUORIC ACID	0	10%	98%		0.00		
Misc Fab Use	HYDROFLUORIC ACID	6397.8	10%	98%		12.80		
Misc Fab Use	HYDROFLUORIC ACID	163.7	10%	98%		0.33		
Misc Fab Use	HYDROFLUORIC ACID	2.2	10%	98%		0.00		
Misc Fab Use	HYDROFLUORIC ACID	55.6	10%	98%		0.11		
Misc Fab Use	HYDROFLUORIC ACID	10.0	10%	98%		0.02		
Photo	HYDROFLUORIC ACID	0	10%	98%		0.00		
Wet Process	HYDROFLUORIC ACID	98051.3	10%	98%		196.10		
Wet Process	HYDROFLUORIC ACID	114650.9	10%	98%		229.30		
Wet Process	HYDROFLUORIC ACID	86137.7	10%	98%		172.28		
							Emissions from HF Use	**Emissions including HF Formed**
Wet Process	HYDROFLUORIC ACID	97396.0	10%	98%		194.79	**(T/yr)**	**(T/yr)**
	HYDROFLUORIC ACID Total					**807.89**	**0.404**	**3.302**

Micron 2004 HF Formation Example Calculations

Department	Parent Chemical	Component (lbs)	Percent Emitted	Formation Ratio	HCl Formed (lbs)	Scrubber Efficiency	HCl Emitted (lbs)
Etch	BORON TRICHLORIDE	830	0.9	0.9	672.30	95%	33.62
Etch	BORON TRICHLORIDE	900	0.9	0.9	729.00	95%	36.45
Etch	BORON TRICHLORIDE	90	0.9	0.9	72.90	95%	3.65
CVD	CHLORINE TRIFLUORIDE	178.2	0.99	0.4	70.57	95%	3.53
CVD	CHLORINE TRIFLUORIDE	85.5954	0.99	0.4	33.90	95%	1.69
CVD	CHLORINE TRIFLUORIDE	29.7	0.99	0.4	11.76	95%	0.59
Diffusion	CHLORINE TRIFLUORIDE	29.7	0.99	0.4	11.76	95%	0.59
CVD	DICHLOROSILANE	3760.3	0.9	0.7	2368.73	95%	118.44
CVD	DICHLOROSILANE	2350.0	0.9	0.7	1480.38	95%	74.02
CVD	DICHLOROSILANE	301.8	0.9	0.7	190.14	95%	9.51
Diffusion	DICHLOROSILANE	1242.6	0.9	0.7	782.78	95%	39.14
Diffusion	DICHLOROSILANE	1020.2	0.9	0.7	642.65	95%	32.13
Diffusion	DICHLOROSILANE	129.4	0.9	0.7	81.49	95%	4.07
CVD	TITANIUM TETRACHLORIDE	926.0	0.9	0.8	666.69	95%	33.33
CVD	TITANIUM TETRACHLORIDE	529.0	0.9	0.8	380.87	95%	19.04
CVD	TITANIUM TETRACHLORIDE	264.6	0.9	0.8	190.48	95%	9.52
Etch	TITANIUM TETRACHLORIDE	264.6	0.9	0.8	190.48	95%	9.52
Lab	TITANIUM TETRACHLORIDE	1.8	0.9	0.8	1.27	95%	0.06
Etch	TRANS-1,2 DICHLOROETHYLENE	2.5	0	0.76	0.00	95%	0.00
Misc	TRANS-1,2 DICHLOROETHYLENE	1.2	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	9.9	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	1.2	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	70.5	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	14.9	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	79.2	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	14.9	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	1.2	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	19.8	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	16.1	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	86.6	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	55.7	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	99.0	0	0.76	0.00	95%	0.00
Misc Fab Use	TRANS-1,2 DICHLOROETHYLENE	17.3	0	0.76	0.00	95%	0.00
Wet Process	TRANS-1,2 DICHLOROETHYLENE	1.2	0	0.76	0.00	95%	0.00
Diffusion	TRANS-1,2 DICHLOROETHYLENE	109.8	0.9	0.76	75.10	95%	3.76
Diffusion	TRANS-1,2 DICHLOROETHYLENE	183.8	0.9	0.76	125.70	95%	6.28
Diffusion	TRANS-1,2 DICHLOROETHYLENE	38.4	0.9	0.76	26.25	95%	1.31
Etch	TRANS-1,2 DICHLOROETHYLENE	11.5	0.9	0.76	7.85	95%	0.39
Etch	TRANS-1,2 DICHLOROETHYLENE	22.5	0.9	0.76	15.38	95%	0.77
Wet Process	TRANS-1,2 DICHLOROETHYLENE	3.9	0.9	0.76	2.64	95%	0.13
					8831.06		441.6 lb/yr
							0.22 T/yr

Micron 2004 HAPs Calculation Example - HF Formation Ratios

Parameter Material Comp	Molecular Weight	Formula		# of Cl or F atoms		Molecular Weight	Formation Ratio
BORON TRICHLORIDE	117	BCl3	->	3	HCl	36.4	0.93
CHLORINE TRIFLUORIDE	92	ClF3	->	1	HCl	36.4	0.40
DICHLOROSILANE	100	SiH2Cl2	->	2	HCl	36.4	0.73
TITANIUM TETRACHLORIDE	188	TiCl4	->	4	HCl	36.4	0.77
TRANS-1,2 DICHLOROETHYLENE	96	C2H2Cl2	->	2	HCl	36.4	0.76
3,3-DICHLORO-1,1,1,2,2-PENTAFLUOROPROPANE (H	202.8	C3HCl2F5	->	5	HF	20	0.49
AMMONIUM BIFLUORIDE	57	NH4HF2	->	2	HF	20	0.70
AMMONIUM FLUORIDE	37	NH4F	->	1	HF	20	0.54
BORON TRIFLUORIDE	68	BF3	->	3	HF	20	0.88
METHYL FLUORIDE	34	CH3F	->	1	HF	20	0.59
NITROGEN TRIFLUORIDE	71	NF3	->	3	HF	20	0.85
TUNGSTEN HEXAFLUORIDE	298	WF6	->	6	HF	20	0.40
XENON DIFLUORIDE	169	XeF2	->	2	HF	20	0.24

Appendix C

Emission Point List

T2-060033

Table C.1 lists all emissions points regulated by the permit at the time of issuance.

TABLE C.1. POINT EMISSION SOURCES

Included in Permit Application	Source ID	Location	Location Type	Equipment Type	In Service as of Permit Issuance?	Equipment Startup Date	Equipment Shutdown Date	Comme
Yes	4-BOI-01	Building 4	Utility Plant	Boiler	Yes	NA		
Yes	4-BOI-02	Building 4	Utility Plant	Boiler	Yes	NA		
Yes	4-BOI-03	Building 4	Utility Plant	Boiler	Yes	NA		
Yes	4-BOI-04	Building 4	Utility Plant	Boiler	Yes	NA		
Yes	4-BOI-05	Building 4	Utility Plant	Boiler	Yes	NA		
Yes	4-BOI-06	Building 4	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	4-BOI-07	Building 4	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-01	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-02	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-03	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-04	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-05	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-06	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-07	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-08	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	25-BOI-09	Building 25	Utility Plant	Boiler-NSPS	Yes	NA		
Yes	32-BOI-01	Building 32	Manufacturing Support	Boiler	Yes	NA		
Yes	80-BOI-01	Building 80	Mask Manufacturing	Boiler	Yes	NA		
Yes	80-BOI-02	Building 80	Mask Manufacturing	Boiler	Yes	NA		
Yes	80-BOI-03	Building 80	Mask Manufacturing	Boiler	Yes	NA		
Yes	80-BOI-04	Building 80	Mask Manufacturing	Boiler	Yes	NA		
Yes	80-BOI-05	Building 80	Mask Manufacturing	Boiler	Yes	NA		
Yes	80-BOI-06	Building 80	Mask Manufacturing	Boiler	Yes	NA		
Yes	1-FS-01	Building 1	Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-FS-02	Building 1	Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-FS-03	Building 1	Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-FS-101	Building 1X	Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-FS-102	Building 1X	Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-FS-103	Building 1X	Manufacturing	Acid Scrubber	Yes	NA		

Included in Permit Application	Source ID	Location	Location Type	Equipment Type	In Service as of Permit Issuance?	Equipment Startup Date	Equipment Shutdown Date	Comme
Yes	1-FS-104	Building 1X	Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-AMS-105	Building 1X	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	3-GBFS-01	Building 3 Gas Bunker	Manufacturing Support	Emergency Scrubber	Yes	NA		
Yes	4-FS-01	Building 4	Utility Plant & Manufacturing Support	Acid Scrubber	Yes	NA		
Yes	4-FS-02	Building 4	Utility Plant & Manufacturing Support	Acid Scrubber	Yes	NA		
Yes	5-FS-01	Building 5	Manufacturing Support	Acid Scrubber	Yes	NA		
Yes	5-FS-02	Building 5	Manufacturing Support	Acid Scrubber	Yes	NA		
Yes	5-FS-03	Building 5	Manufacturing Support	Acid Scrubber	Yes	NA		
Yes	10-FS-01	Building 10B	Chemical Storage	Emergency Scrubber	Yes	NA		
Yes	10-FS-02	Building 10B	Chemical Storage	Emergency Scrubber	No			Future
Yes	15-FS-01	Building 15	Manufacturing	Acid Scrubber	Yes	NA		
Yes	15-FS-02	Building 15	Manufacturing	Acid Scrubber	Yes	NA		
Yes	15-FS-03	Building 15	Manufacturing	Acid Scrubber	Yes	NA		
Yes	15-FS-04	Building 15	Manufacturing	Acid Scrubber	Yes	NA		
Yes	15-AMS-05	Building 15	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	15-AMS-06	Building 15	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	16-FS-01	Building 16	Manufacturing	Acid Scrubber	Yes	NA		
Yes	16-FS-02	Building 16	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-AMS-01	Building 24A	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	24-AMS-02	Building 24A	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	24-FS-03	Building 24A	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-FS-04	Building 24B	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-FS-05	Building 24B	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-FS-06	Building 24C	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-FS-07	Building 24C	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-AMS-08	Building 24A	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	24-FS-09	Building 24C	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-FS-10	Building 24C	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-FS-11	Building 24B	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24-AMS-12	Building 24C	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	24-AMS-13	Building 24C	Manufacturing	Ammonia Scrubber	Yes	NA		
Yes	24D-AMS-01	Building 24D	Manufacturing	Ammonia Scrubber	Yes	NA		

Included in Permit Application	Source ID	Location	Location Type	Equipment Type	In Service as of Permit Issuance?	Equipment Startup Date	Equipment Shutdown Date	Comme
Yes	24D- MPS -01	Building 24D	Manufacturing	Multipurpose Scrubber	Yes	NA		
Yes	24D-FS-01	Building 24D	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24D-FS-02	Building 24D	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24D-FS-03	Building 24D	Manufacturing	Acid Scrubber	Yes	NA		
Yes	24D-FS-04	Building 24D	Manufacturing	Acid Scrubber	Yes	NA		
Yes	26-FS-01	Building 26	Manufacturing	Acid Scrubber	Yes	NA		
Yes	26-FS-02	Building 26	Manufacturing	Acid Scrubber	Yes	NA		
Yes	80-FS-01	Building 80	Mask Manufacturing	Acid Scrubber	Yes	NA		
Yes	80-FS-02	Building 80	Mask Manufacturing	Acid Scrubber	Yes	NA		
Yes	1-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	1X-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	4-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	10-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	15-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	16-GEN-01	Grounds	Grounds	Emergency Generator	No			Future
Yes	17-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	17C-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	26-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	24-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	25-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	6-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	38-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	24D-GEN-01	Grounds	Grounds	Emergency Generator	No			Future
Yes	24D-GEN-02	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	24D-GEN-03	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	36-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	36-GEN-02	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	36-GEN-03	Grounds	Grounds	Emergency Generator	No			Future
Yes	80-GEN-01	Grounds	Grounds	Emergency Generator	Yes	NA		
Yes	80-GEN-02	Grounds	Grounds	Emergency Generator	No			Future
Yes	FWP-2	Building 22C	Grounds	Emergency Fire-Water Pump	Yes	NA		
Yes	1X-VOC	Building 1X	Manufacturing	VOC Abatement Unit	Yes	NA		
Yes	2-VOC	Building 2	Manufacturing	VOC Abatement Unit	Yes	NA		

Included in Permit Application	Source ID	Location	Location Type	Equipment Type	In Service as of Permit Issuance?	Equipment Startup Date	Equipment Shutdown Date	Comme
Yes	15-VOC	Building 15	Manufacturing	VOC Abatement Unit	Yes	NA		
Yes	24-VOC	Building 24A	Manufacturing	VOC Abatement Unit	Yes	NA		
Yes	24C-VOC	Building 24C	Manufacturing	VOC Abatement Unit	No	NA		Removed prior to p
Yes	24D-VOC	Building 24D	Manufacturing	VOC Abatement Unit	Yes	NA		
Yes	24E-VOC	Building 24E	Manufacturing	VOC Abatement Unit	Yes	NA		
Yes	80-VOC	Building 80	Manufacturing	VOC Abatement Unit	Yes	NA		
Yes	4-COOL-01	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-02	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-03	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-04	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-05	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-06	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-07	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-08	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	4-COOL-09	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	6-COOL-01	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	6-COOL-02	Grounds	Grounds	Cooling Tower Cell	No	NA		Removed prior to p
Yes	6-COOL-03	Grounds	Grounds	Cooling Tower Cell	No	NA		Removed prior to p
Yes	25-COOL-01	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-02	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-03	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-04	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-05	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-06	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-07	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	25-COOL-08	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	38-COOL-01	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	38-COOL-02	Grounds	Grounds	Cooling Tower Cell	Yes	NA		
Yes	SILO1	Grounds	Grounds	Storage Silo	Yes	NA		
Yes	SILO2	Grounds	Grounds	Storage Silo	Yes	NA		

Table C.2 lists all existing boilers at the time of permit issuance and their NSPS applicability.

TABLE C.2. EXISTING BOILERS

Boiler ID	Capacity (MMBtu/hr)	Associated Building	Date Installed/Last Modified	Subject to NSPS Subpart Dc (Y/N)
EU1-0401	12.56	4	7/1/84	N
EU1-0402	12.56	4	7/1/84	N
EU1-0403	25.11	4	7/1/84	N
EU1-0404	25.11	4	4/29/88	N
EU1-0405	29.30	4	11/10/88	N
EU1-0406	29.30	4	8/10/90	Y
EU1-0407	25.11	4	8/14/95	Y
EU1-2501	25.11	25	8/1/94	Y
EU1-2502	12.56	25	12/14/93	Y
EU1-2503	12.56	25	12/14/93	Y
EU1-2504	25.11	25	12/20/93	Y
EU1-2505	25.11	25	1/26/95	Y
EU1-2506	25.11	25	11/1/95	Y
EU1-2507	25.11	25	11/1/95	Y
EU1-2508	25.11	25	4/21/97	Y
EU1-2509	25.11	25	4/21/97	Y
EU1-3201	1.125	32	N/A	N
EU1-8001	<10	80	N/A	N
EU1-8002	<10	80	N/A	N
EU1-8003	<10	80	N/A	N
EU1-8004	<10	80	N/A	N
EU1-8005	<10	80	N/A	N
EU1-8006	<10	80	N/A	N
Total existing capacity	<420			

Table C.3 lists the size (rated Hp) of the existing emergency equipment.

TABLE C.3. EXISTING EMERGENCY EQUIPMENT

Generator	Rated Hp[1]	Associated Building	Stack/ Vent	Source ID[2]
GENERATOR 02	339	10	1	10-GEN-01
GENERATOR 03	1443	15	1	15-GEN-01
GENERATOR 04	1851	24	1	24-GEN-01
GENERATOR 06	1801	1	1	1-GEN-01
GENERATOR 07	1851	26	1	26-GEN-01
GENERATOR 08	1801	2	1	2-GEN-01
GENERATOR 09	449	38	1	38-GEN-01
GENERATOR 10	1826	4	1	4-GEN-01
GENERATOR 11	1826	25	1	25-GEN-01
GENERATOR 12	1826	17	1	17-GEN-01
GENERATOR 13	1826	6	1	6-GEN-01
GENERATOR 14	1826	17	1	17C-GEN-01
GENERATOR 15	1826	24D	2	24D-GEN-02
GENERATOR 16	1826	24D	1	24D-GEN-01
GENERATOR 17	1851	36	1	36-GEN-02
GENERATOR 18	1851	36	1	36-GEN-01
GENERATOR 19	1826	80	1	80-GEN-01
FIRE WATER PUMP	481	FWP	2	FWP-2

1 Rated Hp provided in the permit application, Appendix E-1.
2 Source ID provided in the permit application, Table L-1.

Appendix D

Emission Calculations and Emission Factors

T2-060033

Boiler emissions

Monthly emissions from the natural gas fired boilers at MTI shall be calculated using the following equation:

T/yr of emissions = rolling 12-month natural gas usage (MMscf) x EF (lb/MMscf) x 1 T/2000 lb

TABLE D.1 EMISSION FACTORS FOR EXTERNAL NATURAL GAS COMBUSTION

Pollutant	Boiler Size	Emission Factor (EF) (lb/MMscf)
PM_{10}	all	7.6
SO_2	all	2.3
NO_X	10 – 30 MMBtu/hr	75.6
	<10 MMBtu/hr	100
CO	10 – 30 MMBtu/hr	79.8
	<10 MMBtu/hr	84
VOC	all	5.5
Pb	all	0.0005
Specific HAPs	all	AP-42, Table 1.4-3, July 1998 version

Emergency Generator Emissions

Monthly emissions from the diesel-fired emergency generators at MTI shall be calculated using the following equations:

T/yr = rolling 12-month hours of operation (hr/yr) x EF (g/hp-hr) x rated capacity (hp) x (1 lb/454 g) x 1 T/2000 lb

TABLE D.2 EMISSION FACTORS FOR DIESEL GENERATORS

Pollutant	Generator size or specific generator[1]	Emission Factor (EF) (g/hp-hr)
PM_{10}	Gen - 04, 07, 17, 18, 22	0.07
	Gen – 06, 08	0.296
	Gen - 10, 11, 12, 13, 14, 15, 16, 19	0.211
	Gen - 09	0.842
	>600 hp	0.318
	<600 hp	1
SO_2	Gen - 04, 07, 17, 18, 22	0.57
	Gen – 06, 08	0.635
	Gen - 09	0.605
	>600 hp	1.835
	<600 hp	0.931
NO_X	Gen - 04, 07, 17, 18, 22	12.6
	Gen – 06, 08	8.37
	Gen - 10, 11, 12, 13, 14, 15, 16, 19	8.09
	Gen - 09	9.08
	>600 hp	11
	<600 hp	14
CO	Gen - 04, 07, 17, 18, 22	0.58
	Gen – 06, 08	1.559
	Gen - 10, 11, 12, 13, 14, 15, 16, 19	2.961
	Gen - 09	2.9
	>600 hp	2.4
	<600 hp	3.03
VOC	Gen - 04, 07, 17, 18, 22	0.13
	Gen – 06, 08	0.106
	Gen - 10, 11, 12, 13, 14, 15, 16, 19	0.405
	Gen - 09	0.156
	>600 hp	0.33
	<600 hp	1.35

1 Manufacturer specific emission factors for numbered units. Emissions factors for other generators (>600 hp or <600 hp are from AP-42, Sections 3.4 and 3.3, respectively.

Manufacturing process emissions calculations and emissions factors

Emissions of each HAP used at MTI are determined by mass balance. Emissions shall be calculated by: 1) summing the total amount used in each process for the previous consecutive 12-month period, 2) subtracting the amount of each HAP shipped offsite in a waste shipment, returned the supplier, or otherwise accounted for, 3) multiplying by the estimated evaporation or emissions rate, and 4) multiplying by the air pollution control efficiency. An example HF calculation is as follows:

HF usage emissions
HF emissions (lb/yr) = [HF used in the process (pounds/yr) – HF returned to vendor (pounds/yr) – HF sent in waste shipments (pounds/yr)] * evaporation rate * scrubber control efficiency

192 lbs HF/yr = (98,051 lbs – 570 lbs – 1100 lbs) * 0.1 * (1-0.98)

Emissions of HF and HCl can also be formed from the use of other chemicals such as boron trifluoride (see Table B.4 below). These emissions must be included in the calculation of total emissions from the facility. An example calculation is as follows:

HF formation emissions
HF emissions (lb/yr) = chemical usage (lb/yr) * HF formation ratio * scrubber control efficiency

1,763 lb/yr = 163,259 lb ammonium fluoride/yr * 0.54 * (1-0.98)

Total HF emissions
HF emissions (T/yr) = [HF usage emissions (lb/yr) + HF formation emissions (lb/yr)] * 1 T/2000 lb

0.98 T/yr HF = [192 lb + 1,763 lb] * 1/2000

TABLE D.3 MANUFACTURING PROCESS EMISSION FACTORS AND ASSUMPTIONS

Pollutant	Emission Factor	Comments
Liquid evaporation rate	10%	Chemicals used in baths
Gaseous form emission rate	90%	Assumes all goes to scrubber, except 10% returned to vendor in heel.
Wet scrubber control efficiency	95% control efficiency - inorganic HAP 98% control efficiency - HF 90% control efficiency – particulate matter	
VOC abatement unit control efficiency	98% control efficiency - organic HAP	
Water treatment chemical emission rate	0%	Water treatment is closed-loop system

When calculating the total amount of each chemical used, MTI may subtract the amount of chemicals shipped offsite as hazardous waste, returned to the chemical supplier in bottles for refill, or otherwise accounted for.

100% of the chemicals used in the water treatment plant are assumed to be completely consumed.

HF and HCl are also formed from the chemical reactions of other compounds used. MTI calculates that the chemicals used in Table 9.4 form HF or HCl at the rates identified.

For any new chemicals used at MTI that may form HCl or HF the formation ratio is calculated as follows:

Formation ratio = (molecular weight of HCl or HF) / (molecular weight of chemical) * (number of Cl or F atoms in the chemical)

For example, the formation ration of boron trichloride is calculated as follows:

BCl_3 formation ratio = molecular weight of HCl / molecular weight of BCl_3 * number of Cl atoms in BCl_3

BCl_3 formation ratio = 36.4 / 117 * 3 = 0.93

TABLE D.4. HF AND HCL FORMATON RATIOS

Chemical	Forms	Formation Ratio
Boron trichloride	HCl	0.93
Chlorine Trifluoride	HCl	0.40
Dichlorosilane	HCl	0.73
Titanium Tetrachloride	HCl	0.77
Trans-1,2 dichloroethylene	HCl	0.76
3,3-dichloro-1,1,1,2,2-pentafluoropropane	HF	0.49
Ammonium bifluoride	HF	0.70
Ammonium fluoride	HF	0.54
Boron trifluoride	HF	0.88
Methyl fluoride	HF	0.59
Nitrogen trifluoride	HF	0.85
Tungsten hexafluoride	HF	0.40
Xenon difluoride	HF	0.24

Appendix E

Modeling Review

T2-060033

MEMORANDUM

DATE: June 28, 2007

TO: Zach Klotovich, P.E., Environmental Engineer, Discipline Lead, Division of Technical Services

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program
Darrin Mehr, Air Quality Analyst, Air Program

PROJECT NUMBER: T2-060033

SUBJECT: Modeling Review for Micron Technology, Inc., Facility Emission Cap (FEC) Tier II Operating Permit for their facility in Boise, Idaho.

1.0 Summary

Micron Technology, Inc. (Micron) submitted a revised application for a facility-wide Tier II operating permit for the semiconductor manufacturing facility in Boise, Idaho. Modeling was conducted by Geomatrix. The application requests authorization to operate the facility under a facility emission cap (FEC) permit, and to authorize the construction of projects that may increase emissions under the FEC permit limitations. The application replaces the Tier II permit application submitted to DEQ on March 14, 2003. This permit for this project will allow the addition of semiconductor manufacturing equipment, supporting equipment, and emissions control devices, which may be needed as product design specifications are altered and production rate increases require process changes. The requested permit will establish facility-wide emissions caps on criteria air pollutants and toxic air pollutants (TAPs).

The application states that the purposes behind this requested permit action are to:

1. Update the Boise facility's emission inventory,
2. Refine proposed facility emission caps,
3. Propose permit terms for the FEC permit,
4. Pre-authorize potential minor source modifications to the facility, which may include increased manufacturing capacity and associated air pollutant emissions while operating under the FEC permit,
5. Incorporate terms from Microns's amended third Consent Order,
6. Develop and incorporate a proposed alternative method for tracking substances regulated by the TAPs regulations.

The facility, as it exists today, consists of four main manufacturing, or fabrication, areas. These are termed "fab" areas. Fab 1A and Fab 1B are two production fabrication areas, Fab 1C is a production research area, and Fab 4 is a research and development area. Please refer to Section 2.2 of the application to review the applicant's description of the manufacturing process. The manufacturing process emissions are generally controlled by acid gas scrubbers, ammonia scrubbers, or volatile organic compound (VOC) abatement devices—generally thermal oxidizers. Numerous emissions sources currently exist at the facility. The number of sources and associated emissions may be increased as process changes and production increases create the need for the manufacture of semiconductor products.

Micron's manufacturing processes require the operation of support facilities, which include natural gas-fired boilers, cooling towers, an industrial waste water treatment plant, gasoline and diesel storage and transfer, painting and welding, and extensive emergency equipment consisting of backup electrical generators and a fire water pump.

This facility's FEC permit application is based on three components: 1) baseline actual emissions, 2) operational variability, and 3) a projected level of growth.

A technical review of the submitted air quality analyses was conducted by DEQ. The submitted modeling analyses in combination with DEQ's staff analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
Micron requested the following annual FEC emission limits for their permit: • NO_x: 126 tons per year (T/yr), • SO_2: 7 T/yr, • CO: 104 T/yr, • PM_{10}: 59 T/yr, • Lead: 0.06 T/yr, and, • VOCs: 176 T/yr.	Micron's modeling demonstration incorporates these requested emission limits which include existing emissions units and processes and proposed emissions units and expanded production capacity. These limits must be included as permit requirements.
Existing emergency electricity generators were each assumed to operate for no more than 200 hours per year (hrs/yr).	Each existing emergency generator must be limited to 200 hrs/yr of operation by permit requirement. The existing generators were modeled at maximum short term emission rates over 24 hours per day
New proposed emergency electrical generators were each assumed to operate for no more than 100 hours per year. TAPs compliance for new emergency generators was not included in the modeling demonstration. Due to the operating limitation of 100 hour per year limitation on each new emergency electrical generator, annual TAPs ambient impacts will be greatly reduced and are not anticipated to cause ambient impacts that are near the allowable TAP increments. These generator engines are typically operated 20 hours per year for testing and maintenance purposes. The facility has requested an operating limit of 100 hours per year.	Each new emergency generator must be limited to 100 hrs/yr by permit requirement. The proposed new generators were modeled at maximum short term emission rates over 24 hours per day.
Micron requested emission limits on NO_x and CO from boilers as a group. Up to five new boilers each rated at up to 30 million Btu per hour (MMBtu/hr) and six new boilers each rated at up to 2 MMBtu/hr may be installed at a future date.	Any combination of natural gas-fired boilers may be constructed for a total rated heat input capacity of 162 MMBtu/hr. All boilers may be constructed at the same time or individually.

Manufacturing process emissions are controlled by one of three types of emission control devices: 1) acid gas scrubber; 2) ammonia scrubber; or 3) thermal oxidizer. Emissions of TAPs and PM_{10} are directly related to the particular emission control device utilized and the application for which they are specifically designed to control emissions.	Operation of the control equipment is necessary to limit pollutant emissions to the quantities represented in the ambient impact demonstration for process emissions of TAPs and PM_{10}.
AERMOD must be used for all modeling performed as required by IDAPA 58.01.01.181 (changes made to the facility under the FEC, but existing modeling does not adequately represent those changes).	AERMOD is the EPA-approved guideline model as of November 9, 2006, that DEQ must use for ambient impact assessments. ISCST3 and ISC3-PRIME will no longer be acceptable models for air quality permitting analyses after this date. The grace period for using ISCST3 for modeling demonstrations in the State of Idaho has expired. Although Micron has an approved modeling protocol for this project, and DEQ has approved the use of ISC3-PRIME for the initial permit issuance of this Tier II/PTC FEC permit, DEQ will require the use of AERMOD for any supplemental modeling performed during the permit's term. In accordance with IDAPA 58.01.01.181.03, DEQ has determined that the most recent regulatory version of AERMOD must be used by Micron to evaluate whether changes that were not adequately covered by the original ISC3-PRIME modeling cause impacts that exceed the significant contribution levels specified by IDAPA 58.01.01.006.101, and, if a significant contribution has been exceeded, whether facility-wide NAAQS compliance would be maintained. The permit should contain a requirement to obtain a DEQ-approved modeling protocol addressing any FEC Rule-required modeling analyses using the current version of AERMOD. Analyses using AERMOD will be used to evaluate NAAQS compliance during the term of the permit. Micron is not required to use AERMOD to re-evaluate TAPs compliance during the term of the permit. TAPs are a state-only requirement and DEQ has determined that the ISCST3 TAPs analysis is adequate for the term of this permit. The 24-hour and annual Chi/Q dispersion factor will be required to be revised upon permit renewal using the regulatory model that is current at that time.
Micron assumed no additional manufacturing capacity would be added in or near Buildings 32 and 80. These buildings are not evaluated as worst-case installations for this FEC permit. Other facility changes may occur at Micron that may or may not have been addressed in the FEC permit application.	Micron will follow the Facility Emission Cap Rules for evaluating process and emissions unit changes if they decide to expand modify the facility at or near Buildings 32 and 80. This also applies to other unanticipated facility changes that may occur during the permit term.
<u>TAPs Emissions</u> Facility changes resulting in an increase in TAPs emissions above the established baseline level were evaluated using an 80% increase in annual emissions of VOCs from the process emissions sources and boilers. Micron evaluated a realistic worst-case scenario, as stated in the application, and identified the emission points with the highest ambient impact for the 24-hour or annual	The permit should contain the Chi/Q ambient impact values as proposed in the permit application. The Chi/Q (referred to as $CQ_{24\text{-hr}}$ and CQ_{annual}) impact values are: • $CQ_{24\text{-hr}}$ = 13.06 micrograms per cubic meter ($\mu g/m^3$) per pound per hour (lb/hr) of emissions, and, • CQ_{annual} = 3.51 $\mu g/m^3$ per lb/hr of emissions.

averaging periods, depending on whether the TAP is regulated as a non-carcinogenic TAP or carcinogenic TAP.	
Micron requested a FEC limit on lead emissions of 0.06 tons per year (120 pounds per year). The modeling demonstration predicted ambient impacts at this level of emissions will meet the NAAQS.	Micron may emit up to 120 pounds per year of lead. This limit should be included in the FEC PTC/Tier II permit.
Micron's analysis considered North Fab and South Fab installations separately. Compliance with NAAQS and TAPs increments was demonstrated using this method. Compliance was not demonstrated with the ambient impacts from both the North and South Fab installations.	Either the North Fab or the South Fab, with emissions units and associated emissions, as detailed in the permit application, may be constructed upon issuance of this project's permit.
The new Photomask Shop, denoted as building JV2, was proposed to be constructed in the permit application. This source demonstrated compliance with NAAQS and TAPs increments.	The new Photomask Shop, with emissions units and their associated emissions, as detailed in the permit application, may be constructed upon issuance of this project's permit.
All proposed process changes and equipment installations described in the application were analyzed as if they were to be constructed as part of the same project.	Micron may make process changes that are supported by the permit application and modeling demonstration all under a single project or in staged projects throughout the permit term.
Ambient impacts of hexavalent chromium (Cr VI) attributed to the proposed boilers were listed at 9.17E-05 $\mu g/m^3$, annual average. This exceeded the allowable increment of 8.3E-05 $\mu g/m^3$, annual average. The allowable increment for Cr VI was incorrectly listed in the permit application as 0.025 $\mu g/m^3$, annual average.	DEQ Internal Policy #AQ-IP-P073 advises that all chromium emissions from natural gas combustion are emitted as trivalent chromium (Cr III). Hexavalent chromium is not anticipated to be emitted from the proposed natural gas-fired boilers; therefore, the ambient impacts of Cr VI do NOT exceed the allowable increment. No permit limitations or further analysis are recommended.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The Micron Boise facility is located in Ada County, designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}). The area operates under limited maintenance plans for PM_{10} and CO.

There are no Class I areas within 10 kilometers of the facility.

2.1.2 Significant and Full Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources at the facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006.102, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant and averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Significant Contribution Levels[a] (μg/m³)[b]**	**Regulatory Limit[c] (μg/m³)**	**Modeled Value Used[d]**
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1st highest[g]
	24-hour	5.0	150[h]	Maximum 6th highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2nd highest[g]
	1-hour	2,000	40,000[j]	Maximum 2nd highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest[g]
	24-hour	5	365[j]	Maximum 2nd highest[g]
	3-hour	25	1,300[j]	Maximum 2nd highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest[g]
Lead (Pb)	Quarterly	NA	1.5[h]	Maximum 1st highest[g]

[a] IDAPA 58.01.01.006.102
[b] Micrograms per cubic meter
[c] IDAPA 58.01.01.577 for criteria pollutants
[d] The maximum 1st highest modeled value is always used for significant impact analysis
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f] Never expected to be exceeded in any calendar year
[g] Concentration at any modeled receptor
[h] Never expected to be exceeded more than once in any calendar year
[i] Concentration at any modeled receptor when using five years of meteorological data
[j] Not to be exceeded more than once per year

2.1.3 TAPs Analyses

The increase in emissions from the proposed modification are required to demonstrate compliance with the toxic air pollutant (TAP) increments, with an ambient impact dispersion analysis for any TAP with a requested potential emission rate that exceeds the screening emission rate limit (EL) specified by IDAPA 58.01.01.585 or 58.01.01.586.

Micron's demonstration incorporates impacts from process emission sources and boilers. Emergency generators were not included in the TAPs compliance demonstration. Due to the requested operating limitation of 100 hours per year on each new emergency electrical generator, annual TAPs ambient impacts will be greatly reduced and are not anticipated to cause ambient impacts that are near the allowable TAP increments. These generator engines are typically operated 20 hours per year for testing and maintenance purposes. Operation of emergency generators during an emergency electricity outage is covered under the excess emissions provisions of the *Rules for the Control of Air Pollution in Idaho* and those operations are not evaluated for TAPs compliance.

For those TAPs emitted by the production process, ambient impacts for compliance with the carcinogenic and non-carcinogenic increments were estimated using the worst-case emission rate of each TAP that is attributable to the increase in emissions above the baseline level of emissions. These emissions amount to approximately 80% of the baseline emissions. The individual TAP emission rate was multiplied by the Chi/Q ambient impact. The Chi/Q impact is the design concentration ambient impact per pound of pollutant emission. Micron has modeled a reasonable worst-case scenario and obtained this Chi/Q value from the process acid scrubber with the highest ambient impact. This acid scrubber was determined to be Acid Scrubber 02 in Building 16 (16-FS-02). Therefore, the ambient impacts listed in the process TAPs compliance demonstration generally should be viewed as being conservative. In addition, the analysis assumes all emissions attributable to the increases allowed under the FEC emissions limits would occur with the same project. The ambient impact design Chi/Q concentrations for acid scrubber stack 16-FS-02 are:

- 13.06 micrograms per cubic meter (μg/m³), per pound per hour (lb/hr) of emissions, 24-hour average, and,

- 3.51 μg/m^3 per lb/hr of emissions, annual average.

Micron also analyzed TAPs impacts for the proposed boilers using the same method used for analyzing the proposed TAPs increases for process emissions. The Chi/Q ambient impact for Boiler 1 located in Building 4 (4-BOI-01) was determined by Micron to be the worst-case rain cap-equipped stack. Emissions for all 162 MMBtu/hr in requested new boiler capacity were multiplied by the 24-hour and annual average Chi/Q values for stack 4-BOI-01. This approach accounts for all boilers being installed as part of the same project for TAPs compliance. The ambient impact design Chi/Q concentrations for rain capped stack 4-BOI-01 are:

- 16.40 μg/m^3 per lb/hr of emissions, 24-hour average, and,
- 2.36 μg/m^3 per lb/hr of emissions, annual average.

Table 3 lists the TAP regulatory screening emission rate limits and allowable increments, used to determine whether a modeling compliance demonstration is required, and the allowable ambient impact for each pollutant of concern for this project.

Table 3. TOXIC AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Screening Emission Rate Limit[a] (lb/hr)[b]	Regulatory Limit (AAC/AACC)[c] (μg/m^3)[d]	Modeled Value Used[e]
Non-Carcinogenic TAPs				
Silica –Quartz	24-hour	0.0067	5	Maximum 1st highest[f]
Silica—Crystalline	24-hour	0.0033	2.5	Maximum 1st highest[f]
Silica—Amorphous	24-hour	0.0067	5	Maximum 1st highest[f]
Ammonia	24-hour	1.2	900	Maximum 1st highest[f]
Chlorine	24-hour	0.2	150	Maximum 1st highest[f]
1,2-Ethanediamine, N-(2-Aminoethyl)	24-hour	0.267	200	Maximum 1st highest[f]
Hydrochloric Acid	24-hour	0.05	375	Maximum 1st highest[f]
Hydrofluoric Acid (Fluorides)	24-hour	0.167	125	Maximum 1st highest[f]
Hydrogen Bromide	24-hour	0.0667	500	Maximum 1st highest[f]
Hydrogen Peroxide	24-hour	0.1	75	Maximum 1st highest[f]
Methylene Bisphenyl Isocyanate	24-hour	0.003	2.5	Maximum 1st highest[f]
Potassium Hydroxide	24-hour	0.133	100	Maximum 1st highest[f]
Sodium Hydroxide	24-hour	0.133	100	Maximum 1st highest[f]
Sodium Metabisulfate	24-hour	0.333	250	Maximum 1st highest[f]
Sulfuric Acid	24-hour	0.067	50	Maximum 1st highest[f]
Carcinogenic TAPs				
Chloroform	Annual	0.00028	0.043	Maximum 1st highest[f]
Formaldehyde	Annual	0.00051	0.077	Maximum 1st highest[f]
Arsenic	Annual	1.5E-06	2.3E-04	Maximum 1st highest[f]
Cadmium	Annual	3.7E-06	5.6E-04	Maximum 1st highest[f]
Chromium (+6)	Annual	5.6E-07	8.3E-05	Maximum 1st highest[f]
Nickel	Annual	2.7E-05	4.2E-03	Maximum 1st highest[f]

[a]IDAPA 58.01.01.585 and 586
[b]Pounds per hour
[c]Increment for acceptable ambient concentration for non-carcinogens and acceptable ambient concentration for carcinogens
[d]Micrograms per cubic meter
[e]The maximum 1st highest modeled value is used to establish TAPs compliance
[f]Concentration at any modeled receptor, never expected to be exceeded in any day for the 24-hour averaging period and never to be exceeded in any calendar year for the annual averaging period

2.2 Background Concentrations

Ambient background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Background concentrations used in these analyses are listed in Table 3. Background concentrations for carbon monoxide (CO) 1-hour and 8-hour averaging periods have been altered in the time period following the original Tier II operating permit's February 14, 2003 modeling protocol approval. The current values are reflected in Table 4.

Table 4. BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
PM_{10}[b]	24-hour	80
	Annual	18
NO_2[c]	Annual	40
Pb[d]	Quarterly	0.00 (0.03)[g]
CO[e]	1-hour	12,200
	8-hour	6,800
SO_2[f]	3-hour	42
	24-hour	26
	Annual	8

[a] Micrograms per cubic meter
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[c] Nitrogen dioxide
[d] Lead
[e] Carbon monoxide
[f] Sulfur dioxide
[g] Lead ambient background concentration of 0.03 $\mu g/m^3$, quarterly average, based on state-wide default value. Micron's analysis used a negligible background concentration for lead.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

The emissions rates for proposed emission units and production process emissions control equipment were estimated based on similar existing emissions sources.

Micron's analysis for this project included three primary scenarios for demonstrating compliance with

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

criteria air pollutant standards (NAAQS) and an additional scenario for toxic air pollutants. The analysis for the toxics relied on the Chi/Q modeling discussed in Section 2.1.3 of this memorandum. The three NAAQS scenarios include:

- a proportional scenario,
- a single stack scenario, and,
- a single building scenario.

The proportional scenario incorporated baseline emissions plus emission increases equivalent to the operational variability component in all existing sources. The modeling of the growth component for the proportional scenario included the following: 1) either the new North Fab or South Fab installation; 2) the new Photomask Shop; and, 3) additional new equipment that is not a part of the new Fab installation or Photomask shop, which includes a boiler, five emergency generators, an acid scrubber, and two back-up scrubber units. Operational variability was not applied to the proposed new units because the impacts from the proposed units would be adequately evaluated under the growth component alone. The operational variability component was not applied to the modeling demonstration for emergency electrical generators for annual averaging periods. Existing emergency generators are limited to the requested 200 hours per year operating limitation.

The single stack scenario modeled all existing emissions units at maximum capacities and emission rates. All proposed growth component emissions sources were included in this scenario at maximum capacity and emission rates. This scenario is termed "single stack" because all of the emission rates attributed to the operational variability component were modeled as being emitted from the point source with an uninterrupted vertical release and the highest ambient impact. This point is non-capped Boiler 04 in Building 4 (4-BOI-04-NC).

The third scenario of the ambient impact demonstration was the single building scenario. This scenario is intended to identify potential ambient impacts if all operational variability component emissions were emitted at the worst-case new building—either North Fab or South Fab. The operational variability component emissions were modeled from the worst case stack the North Fab or the South Fab. The North Fab building's worst-case stack was non-capped boiler 02 (NF-BOI-02NC). The South Fab building's worst-case stack was Generator 01 (SF-GEN-01). Buildings 32 and 80 were not included in this and no expansion of capacity or additional sources are anticipated to be added to these two buildings. As in the single stack scenario, all existing sources and proposed growth component sources were modeled at the maximum capacity and emission rates.

Micron is not required by the FEC Rules to submit a modeling demonstration that portrays the absolute worst-case ambient impact scenario for assessing impacts associated with the operational variability component and the growth component. However, the scenarios submitted by Micron represent a level of underlying conservatism in the analysis in the modeling of the operational variability and growth portions of the requested FEC limitations. If future changes at the facility are not adequately simulated by the submitted modeling analyses, additional analyses must be conducted as required by IDAPA 58.01.01.181.

Table 5 provides a summary of the modeling parameters used in the DEQ verification analyses and Micron's analyses.

Table 5. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Model	ISC3-PRIME	ISC3PBEE, Version 04272/BEE-LINE BEEST, Versions 9.60a and 9.50. This model incorporates EPA's latest version of ISC3-PRIME. Version 04269 was the last version of ISC3-PRIME adopted as a regulatory guideline model. DEQ experienced difficulties using the ISC3P Version 04269 model and performed all verification runs using ISC3PBEE, Version 04272. BEE-LINE Software developed BEEST, the graphic user interface used by DEQ for the verification analyses.
Meteorological data	1987-1991	Boise surface and upper air data with a minimum mixing height of 50 meters.
Land Use (urban or rural)	Rural	Rural dispersion coefficients were used by Micron based on population density data taken from LandView III software and agricultural zoning for much of the land which borders the facility.
Terrain	Considered	Receptor 3-dimensional coordinates were obtained by Geomatrix from USGS DEM files and used to establish elevation of ground level receptors. DEQ did not re-import the DEM files.
Building downwash	Downwash algorithm	Building dimensions obtained from modeling files submitted, and BPIP-PRIME was used to evaluate downwash effects.
Receptor grid	Grid 1	25 meter spacing along ambient air boundary. All nested grids were centered on the facility and receptors were deleted inside the facility's ambient air boundary.
	Grid 2	50 meter spacing for a 4,000 meter by 4,000 meter grid centered on the densest section of structures and sources in the north end of the facility.
	Grid 3	200 meter spacing for an 11,000 meter by 11,000 meter nested grid

3.1.1 Modeling protocol

A protocol was submitted by Micron to DEQ prior to submission of the original Tier II permit application, on January 20, 2003. DEQ approved the modeling protocol by letter on February 14, 2003, with comments. The original Tier II permit application was declared administratively complete on June 2, 2003. A final Tier II permit was not issued by DEQ for the original application.

Micron checked with DEQ to verify that the modeling protocol and use of ISCST3 still met DEQ approval, considering the November 9, 2006 cutoff deadline for the use of ISCST3 or ISC3-PRIME instead of AERMOD. Micron submitted a combination PTC/Tier II FEC permit application in place of the original Tier II permit, and used ISC3-PRIME in place of ISCST3 to account for the potential effects of building downwash on modeled ambient impacts.

Modeling was conducted using methods and data presented in the modeling protocol and the *State of Idaho Air Quality Modeling Guideline*, except where noted.

3.1.2 Model Selection

ISC3-PRIME was used to model this project. DEQ approved Micron's use of ISC3-PRIME for this project. The application was submitted before AERMOD was required by DEQ for use as the regulatory guideline model for NAAQS analyses to demonstrate compliance with the requirements of IDAPA 58.01.01.203 and 403. The PRIME algorithms in BPIP-PRIME and ISC3-PRIME calculate ambient impacts within building recirculation cavities. Building downwash effects were a concern for several sources at this facility, and ISC3-PRIME was the appropriate model to use if an ISCST3 model was used for the analyses.

3.1.3 Meteorological Data

Boise surface and upper air meteorological data from 1987 to 1991 was used for the Micron site in Boise.

3.1.4 Terrain Effects

The modeling analyses submitted by Micron considered elevated terrain. The actual elevation of each receptor was determined using United Geological Survey (USGS) digital elevation map (DEM) files. Elevations of emission sources, buildings, and receptors were not regenerated from DEM files for DEQ's verification analyses.

3.1.5 Facility Layout

DEQ verified proper identification of the facility boundary and buildings on the site by comparing the modeling input to a scaled plot plan submitted with the application. Satellite images of the site were also obtained from the Google Earth internet site to confirm the facility layout.

3.1.6 Building Downwash

Plume downwash effects caused by structures present at the facility were accounted for in the modeling analyses. The Building Profile Input Program (BPIP) with the PRIME algorithm was used by the applicant to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for ISC3-PRIME for building-induced downwash effects.

3.1.7 Ambient Air Boundary

Ambient air was determined to exist for all areas immediately exterior to the Micron facility's property boundary. Entry onto the facility is controlled by security personnel. The public is not invited on-site or allowed to access the facility without specific authorization. This was approved as a sufficient boundary to demark ambient air.

3.1.8 Receptor Network

The receptor grids used by Micron met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ verification analyses were conducted using the same receptor grids.

3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for DEQ verification modeling:

- All modeled criteria pollutant emissions rates were equal to or greater than the Micron facility's emissions calculated in the PTC application.
- All of Micron's Chi/Q modeling runs were conducted using an emission rate of 1 lb/hr for each point of emissions. Toxic air pollutant (TAP) emission rates equal to those in Micron's application were used in the review of the Chi/Q impact analysis.

Refer to Appendix A to review the emissions rates used for the three modeling cases, or scenarios, presented by Micron, which are a "proportional" scenario, a worst-case single building scenario, and a worst-case single stack scenario.

The modeling demonstration relies on emissions rates calculated to support Micron's baseline level of emissions and the requested facility emission cap limitations. Table 6 lists the annual air pollutant emissions associated with each component of the FEC permit application.

Table 6. CRITERIA AIR POLLUTANTS FEC PERMIT PROJECT COMPONENTS

FEC[a] Permitting Project Component	NO_x (T/yr)	CO (T/yr)	SO_2 (T/yr)	VOCs (T/yr)	PM_{10} (T/yr)	Pb (T/yr)
Baseline Actual Emissions	39	36	1	98	33	0.02
Operational Variability Component (OVC)	39	37	1	23	14	0.02
Growth Component	48	31	5	55	11	0.02
Total FEC Limitation	126	104	7	176	59	0.06

[a] Facility emission cap
[b] Tons per year

Daily emissions were modeled by Micron using the maximum daily rate evenly distributed over 24 hours. The annual emissions, whether calculated at maximum equipment capacity or a limited capacity, were modeled over 8,760 hours per year.

Micron accounted for non-operation of all standby, or backup, scrubbers by modeling them with pollutant emission rates of 0.0 pounds per hour. The backup emission control units operate only during emergency periods or while the primary emissions control units are shut down for maintenance activities. Therefore, Micron modeled the emissions releases that will occur during normal operations.

Emissions from proposed boilers were estimated at rated capacity for short-term averaging periods, but for annual averaging period modeling the annual emissions were limited to emission rates based on a 36% capacity factor for 11 months out of the year, and at 100% capacity for the remaining month of the year. These emission rates are accounted for in the annual facility emission cap limitations.

Table 7 lists the modeled TAP emissions rates for the proposed emission increases for the production processes. Hourly emissions rates were derived by Micron by dividing annual emissions subject to TAPs review by 8,760 hours per year. Table 8 lists modeled TAPs emissions rates for the eleven proposed boilers (or any combination of boilers up to 162 MMBtu/hr heat input). Hourly emissions were derived in the same manner as the production process TAPs emissions rates. Daily emissions were modeled by Micron using the maximum daily rate evenly distributed over 24 hours and annual emissions were modeled over 8,760 hours.

Table 7. MODELED PROPOSED PROCESS SOURCES TOXIC AIR POLLUTANT EMISSIONS RATES	
Pollutant	Emissions Sources: Production Processes (lb/hr)[a]
Carcinogenic TAPs	
Chloroform	4.8E-04
Formaldehyde	0.0015
Methylene Chloride	0.0032
Non-Carcinogenic TAPs	
Silica – Quartz	0.31
Silica – Amorphous Fused	0.19
Silica -- Crystalline	0.0063
Ammonia	13.06
Chlorine	0.63
1,2-Ethanediamine, N-(2-Aminoethyl)	0.79
Hydrochloric Acid	0.72
Hydrofluoric Acid (Fluorides)	0.92
Hydrogen Bromide	0.09
Hydrogen Peroxide	0.28
Methylene Bisphenyl Isocyanate	0.02
Potassium Hydroxide	0.92
Sodium Hydroxide	0.28
Sodium Metabisulfate	0.89
Sulfuric Acid	0.10

[a] Pounds per hour

Table 8. MODELED PROPOSED BOILERS TOXIC AIR POLLUTANT EMISSIONS RATES	
Pollutant	Emissions Sources: 162 MMBtu/hr[a] of Natural Gas-fired Boilers[b] (lb/hr)[c]
Carcinogenic TAPs	
Arsenic	3.09E-05
Cadmium	1.70E-04
Chromium VI	3.89E-05
Formaldehyde	1.16E-02
Nickel	3.24E-04

[a] Million British thermal units per hour
[b] Emissions units described as five boilers rated at 30 MMBtu/hr heat input capacity and six boilers rated at 2 MMBtu/hr heat input capacity
[c] Pounds per hour

3. 3 Emission Release Parameters

Table 9 provides emissions release parameters, including modeled location, stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. Table 10 contains data used for the modeling of volume sources.

For proposed new sources Micron assumed that the release parameters would be similar to certain existing emissions units and emissions control equipment. Existing acid scrubber 1X-FS-01 parameters were used for proposed acid scrubbers. Proposed VOC abatement control systems used unit 1X-VOC's exhaust parameters. Proposed boilers used existing boiler 4-BOI-05 exhaust parameters, and proposed generators used the exhaust parameters for existing generator 24D-GEN-02.

Values used in the analyses appeared reasonable and within expected ranges. Additional documentation/verification of these parameters was not required.

Table 9. POINT SOURCE STACK PARAMETERS								
Release Point	**Source Description**	**X UTM[a] Coordinate (m)[b]**	**Y UTM Coordinate (m)**	**Source Base Elevation (m)**	**Stack Height (m)**	**Stack Gas Flow Temperature (K)[c]**	**Stack Gas Flow Velocity[e] (m/sec)[d]**	**Modeled Stack Diameter (m)**
NFFS01	New North FAB Acid Scrubber 01	568856.19	4820000.5	929.74	22.56	288.7	22.53	0.97
NFFS02	New North FAB Acid Scrubber 02	568856.19	4819969.5	930.15	22.56	288.7	22.53	0.97
NFFS03	New North FAB Acid Scrubber 03	568856.19	4819941.5	930.52	22.56	288.7	22.53	0.97
NFFS04	New North FAB Acid Scrubber 04	568934.88	4820000.5	930.2	22.56	288.7	22.53	0.97
NFFS05	New North FAB Acid Scrubber 05	568934.88	4819969.5	930.41	22.56	288.7	22.53	0.97
NFFS06	New North FAB Acid Scrubber 06	568934.88	4819941.5	930.74	22.56	288.7	22.53	0.97
NFVOC	New North FAB VOC Abatement Unit	568951.06	4819990.5	930.31	20.73	663.7	31.12	0.36
NFBOI01	New North FAB Boiler 01	568951.88	4819939.5	930.73	10.67	520.9	0.001	0.76
NFBOI02	New North FAB Boiler 02	568957.38	4819939	930.78	10.67	520.9	0.001	0.76
NFBOI03	New North FAB Boiler 03	568962.88	4819939	930.81	10.67	520.9	0.001	0.76
NFBOI04	New North FAB Boiler 04	568968.25	4819939	930.81	10.67	520.9	0.001	0.76
NFGEN01	New North FAB Generator 01	569008.38	4819964.5	930.46	5.49	710.4	157.52	0.20
NFGEN02	New North FAB Generator 02	569008.56	4819954	930.47	5.49	710.4	157.52	0.20
SFFS01	New South FAB Acid Scrubber 01	569151.12	4819426.5	933.31	22.56	288.7	22.53	0.97
SFFS02	New South FAB Acid Scrubber 02	569142.5	4819454.5	933.21	22.56	288.7	22.53	0.97
SFFS03	New South FAB Acid Scrubber 03	569133.31	4819480	933.33	22.56	288.7	22.53	0.97
SFFS04	New South FAB Acid Scrubber 04	569221.81	4819447	935.65	22.56	288.7	22.53	0.97
SFFS05	New South FAB Acid Scrubber 05	569210.81	4819476.5	935.34	22.56	288.7	22.53	0.97
SFFS06	New South FAB Acid Scrubber 06	569203.12	4819502.5	934.96	22.56	288.7	22.53	0.97
SFVOC	New South FAB VOC Abatement Unit	569170.5	4819519.5	934.61	20.73	663.7	31.12	0.36
SFBOI01	New South FAB Boiler 01	569169.69	4819392.5	933.37	10.67	520.9	0.001	0.76

SFBOI02	New South FAB Boiler 02	569170.88	4819388	933.28	10.67	520.9	0.001	0.76
SFBOI03	New South FAB Boiler 03	569173.25	4819383	933.25	10.67	520.9	0.001	0.76
SFBOI04	New South FAB Boiler 04	569175.62	4819378.5	933.24	10.67	520.9	0.001	0.76
SFGEN01	New South FAB Generator 01	569189.12	4819370.5	933.59	5.49	710.4	157.52	0.20
SFGEN02	New South FAB Generator 02	569200.38	4819374	934.18	5.49	710.4	157.52	0.20
25BOI10N	New Boiler Building 25	569146.88	4819606.5	933.98	13.41	520.9	0.001	0.91
16GEN01N	New Generator 01 Building 16	568965	4819557	932.37	5.49	710.4	157.52	0.20
24GEN02N	New Generator 02 Building 24	569177.5	4819460.5	934.9	5.49	710.4	157.52	0.20
26GEN02N	New Generator 02 Building 26	569043.38	4819338	930.95	5.49	710.4	157.52	0.20
36GEN03N	New Generator 03 Building 36	569222.94	4819256.5	933.32	5.49	710.4	157.52	0.20
80GEN02N	New Generator 02 Building 80	569952.81	4819771.5	935.19	14.63	710.4	157.52	0.20
26FS03N	New Acid Scrubber 03 Building 26	568978.12	4819387	930.26	15.24	288.7	7.28	1.22
JV2BOI1N	New Photomask Facility New Boiler 1	569534.81	4817819.5	943.47	14.63	449.8	0.000	0.41
JV2GEN1N	New Photomask Facility New Generator 1	569545.5	4817806	943.77	14.63	710.4	157.52	0.20
JV2GEN2N	New Photomask Facility New Generator 2	569542.19	4817791	944.24	14.63	710.4	157.52	0.20
JV2FS01N	New Photomask Facility New Acid Scrubber 01	569492.38	4817845	942.82	14.63	289.3	9.50	1.07
JV2VOCN	New Photomask Facility New VOC Abatement Unit	569481.19	4817859.5	942.41	26.21	663.7	23.23	0.36
4BOI01	Building 4 Boiler 01	568914.69	4819751	932.14	10.67	520.9	0.001	0.55
4BOI02	Building 4 Boiler 02	568918.62	4819751	932.18	10.67	520.9	0.001	0.55
4BOI03	Building 4 Boiler 03	568922.69	4819751	932.22	10.67	520.9	0.001	0.76
4BOI04	Building 4 Boiler 04	568926.69	4819751	932.26	10.67	520.9	0.001	0.76
4BOI05	Building 4 Boiler 05	568930.69	4819751	932.29	10.67	520.9	0.001	0.76
4BOI06	Building 4 Boiler 06	568934.62	4819751	932.3	10.67	520.9	0.001	0.76
4BOI07	Building 4 Boiler 07	568938.69	4819751	932.3	10.67	520.9	0.001	0.76
25BOI01	Building 25 Boiler 01	569103	4819606.5	933.82	13.41	520.9	0.001	0.61
25BOI02	Building 25 Boiler 02	569107.62	4819606.5	933.85	13.41	520.9	0.001	0.61
25BOI03	Building 25 Boiler 03	569112.12	4819606.5	933.86	13.41	520.9	0.001	0.91
25BOI04	Building 25 Boiler 04	569116.69	4819606.5	933.85	13.41	520.9	0.001	0.91
25BOI05	Building 25 Boiler 05	569123.62	4819606.5	933.86	13.41	520.9	0.001	0.61
25BOI06	Building 25 Boiler 06	569128.12	4819606.5	933.89	13.41	520.9	0.001	0.91
25BOI07	Building 25 Boiler 07	569132.69	4819606.5	933.91	13.41	520.9	0.001	0.91
25BOI08	Building 25 Boiler 08	569137.31	4819606.5	933.93	13.41	520.9	0.001	0.91
25BOI09	Building 25 Boiler 09	569142.12	4819606.5	933.95	13.41	520.9	0.001	0.91
32BOI01	Building 32 Boiler 01	568645.31	4820115.5	928.75	6.71	520.9	0.001	0.36
80BOI1	Building 80 Boiler 1	569924.88	4819763	934.64	14.63	449.8	0.001	0.41
4COOL01	Building 4 Cooling Tower 01	568910.31	4819782.5	931.9	6.10	0.0	7.92	3.96
4COOL02	Building 4	568914.81	4819782.5	931.94	6.10	0.0	7.92	3.96

	Cooling Tower 02							
4COOL03	Building 4 Cooling Tower 03	568919.38	4819782.5	931.97	6.10	0.0	7.92	3.96
4COOL04	Building 4 Cooling Tower 04	568924	4819782.5	932.02	6.10	0.0	7.92	3.96
4COOL05	Building 4 Cooling Tower 05	568928.5	4819782.5	932.06	6.10	0.0	7.92	3.96
4COOL06	Building 4 Cooling Tower 06	568937.38	4819782	932.09	7.62	0.0	4.27	7.32
4COOL07	Building 4 Cooling Tower 07	568946	4819782	932.16	7.62	0.0	4.27	7.32
4COOL08	Building 4 Cooling Tower 08	568971.19	4819783.5	932.38	7.62	0.0	5.18	6.10
4COOL09	Building 4 Cooling Tower 09	568971.19	4819776.5	932.45	7.62	0.0	5.18	6.10
38COOL01	Building 38 Cooling Tower 01	569429.31	4819148	939.19	7.32	0.0	10.06	3.05
6COOL01	Building 6 Cooling Tower 01	568983.38	4819731.5	932.79	4.27	0.0	12.80	2.44
6COOL02	Building 6 Cooling Tower 02	568983.38	4819720.5	932.83	4.27	0.0	12.80	2.44
6COOL03	Building 6 Cooling Tower 03	568983.38	4819709.5	932.9	4.27	0.0	12.80	2.44
25COOL01	Building 25 Cooling Tower 01	569112.19	4819649	933.69	10.67	0.0	4.27	7.32
25COOL02	Building 25 Cooling Tower 02	569121.31	4819649	933.62	10.67	0.0	4.27	7.32
25COOL03	Building 25 Cooling Tower 03	569130.5	4819649	933.69	10.67	0.0	4.27	7.32
25COOL04	Building 25 Cooling Tower 04	569139.62	4819649	933.52	10.67	0.0	4.27	7.32
25COOL05	Building 25 Cooling Tower 05	569146.69	4819677	933.18	10.67	0.0	4.27	7.32
25COOL06	Building 25 Cooling Tower 06	569156.88	4819677	933.14	10.67	0.0	4.27	7.32
25COOL07	Building 25 Cooling Tower 07	569167.31	4819677	933.18	10.67	0.0	4.27	7.32
25COOL08	Building 25 Cooling Tower 08	569177.62	4819677	933.22	10.67	0.0	4.27	7.32
38COOL02	Building 38 Cooling Tower 02	568983.38	4819709.5	932.9	7.32	0.0	10.06	3.05
1GEN01	Building 1 - Emergency Electrical Generator 01	568941.19	4819838	931.72	3.96	743.2	95.15	0.23
1XGEN01	Building 1X - Emergency Electrical Generator 01	568941.19	4819842	931.68	3.96	743.2	95.15	0.23
4GEN01	Building 4 - Emergency Electrical Generator 01	568946.12	4819745	932.41	5.49	710.4	157.52	0.20
10GEN01	Building 10 - Emergency Electrical Generator 01	569011.62	4819776.5	932.74	2.74	806.5	0.001	0.001
15GEN01	Building 15 - Emergency Electrical Generator 01	568941.69	4819562	932.06	3.96	743.2	0.001	0.001
17GEN01	Building 17 - Emergency Electrical Generator 01	568731.69	4819896.5	929.6	2.74	710.4	157.52	0.20
17CGEN01	Building 17C -	568831.19	4819892.5	930.76	5.49	710.4	157.52	0.20

	Emergency Electrical Generator 01							
26GEN01	Building 26 - Emergency Electrical Generator 01	568976.81	4819450	930.94	4.57	758.2	110.62	0.23
24GEN01	Building 24 - Emergency Electrical Generator 01	569177.12	4819436.5	934.55	4.57	758.2	110.62	0.23
25GEN01	Building 25 - Emergency Electrical Generator 01	569172.12	4819645	933.56	5.49	710.4	157.52	0.20
6GEN01	Building 6 - Emergency Electrical Generator 01	569013.69	4819726.5	932.96	3.66	710.4	157.52	0.20
38GEN01	Building 38 - Emergency Electrical Generator 01	569429.19	4819156.5	939.12	2.74	759.8	61.81	0.15
24DGEN02	Building 24 - Emergency Electrical Generator 02	569183.12	4819405	934.26	5.49	710.4	157.52	0.20
24DGEN03	Building 24 - Emergency Electrical Generator 03	569181.31	4819410.5	934.36	5.49	710.4	157.52	0.20
36GEN01	Building 36 - Emergency Electrical Generator 01	569187	4819297	932.57	4.57	758.2	110.62	0.23
36GEN02	Building 36 - Emergency Electrical Generator 02	569204.81	4819302	933.01	4.57	758.2	110.62	0.23
80GEN01	Building 80 - Emergency Electrical Generator 01	569941.88	4819762	934.8	14.63	710.4	157.52	0.20
FWP2	Fire Water Pump 2	569097.31	4819708.5	932.82	5.49	810.9	77.72	0.15
1FS01	Building 1 Acid Scrubber 01	568868.81	4819879.5	930.89	20.42	288.7	16.50	0.85
1FS02	Building 1 Acid Scrubber 02	568872.62	4819879.5	930.93	20.42	288.7	16.50	0.85
1FS101	Building 1 Acid Scrubber 101	568943.81	4819913.5	931.07	22.56	288.7	22.53	0.97
1FS102	Building 24 Acid Scrubber 03	568943.81	4819910.5	931.1	22.56	288.7	22.53	0.97
1FS103	Building 1 Acid Scrubber 103	568943.81	4819904	931.16	22.56	288.7	22.53	0.97
1AMS105	Building 1 Ammonia Scrubber 105	568869.31	4819914.5	930.81	21.03	288.7	9.66	0.56
4FS02	Building 5 2cid Scrubber 03	568936.5	4819741	932.36	14.63	288.7	8.41	0.91
5FS01	Building 5 Acid Scrubber 01	568856.19	4819754	932.1	12.19	288.7	15.36	0.61
5FS02	Building 5 Acid Scrubber 02	568851.12	4819739.5	932.29	12.19	288.7	15.36	0.61
15FS01	Building 15 Acid Scrubber 01	568901.88	4819663.5	932.66	17.37	288.7	15.52	1.17
15FS02	Building 15 Acid Scrubber 02	568906.19	4819650.5	932.47	17.37	288.7	15.52	1.17
15FS03	Building 15 Acid Scrubber 03	568911.81	4819633	932.37	17.37	288.7	15.52	1.17
15AMS05	Building 15 Ammonia Scrubber 05	568925.5	4819570.5	931.82	17.37	288.7	8.34	0.91

16FS01	Building 16 Acid Scrubber 01	568856	4819610.5	931.33	11.89	288.7	15.52	0.30
24AMS01	Building 24 Ammonia Scrubber 01	569049.31	4819559	933.09	14.63	288.7	14.49	0.76
24AMS02	Building 24 Ammonia Scrubber 02	569045.5	4819557.5	933.08	14.63	288.7	14.49	0.76
24FS03	Building 24 Acid Scrubber 03	569041.69	4819556.5	933.06	14.63	288.7	14.49	0.76
24FS04	Building 24 Acid Scrubber 04	569129.19	4819454.5	932.94	14.63	288.7	7.24	0.76
24FS05	Building 24 Acid Scrubber 05	569126.38	4819463	932.98	14.63	288.7	7.24	0.76
24FS06	Building 24 Acid Scrubber 06	569132	4819447	932.95	17.68	288.7	6.39	1.37
24FS07	Building 24 Acid Scrubber 07	569133.31	4819442.5	932.99	17.68	288.7	6.39	1.37
24AMS08	Building 24 Ammonia Scrubber 08	569065.69	4819564	933.3	14.63	288.7	12.11	0.76
24FS09	Building 24 Acid Scrubber 09	569134.5	4819438.5	933.01	17.68	288.7	12.13	1.22
24AMS13	Building 24 Ammonia Scrubber 13	569143.69	4819446.5	933.23	14.63	288.7	9.71	0.81
26FS01	Building 26 Acid Scrubber 01	568974.12	4819397	930.18	15.24	288.7	7.28	1.22
24DAMS01	Building 24D Ammonia Scrubber 01	569136.5	4819390.5	932.47	19.81	288.7	14.58	1.02
24DMPS01	Building 24D Multi-purpose Scrubber 01	569149	4819382	932.59	19.81	288.7	8.08	0.86
24DFS01	Building 24D Acid Scrubber 01	569156.62	4819359	932.47	19.81	288.7	19.84	1.17
24DFS02	Building 24D Acid Scrubber 02	569154.69	4819364.5	932.49	19.81	288.7	19.84	1.17
24DFS03	Building 24D Acid Scrubber 03	569152.81	4819370.5	932.53	19.81	288.7	19.84	1.17
80FS01	Building 24 Acid Scrubber 03	569884.88	4819787.5	935.14	14.63	289.3	9.50	1.07
1XVOC	Building 1X VOC Abatement Device	568895.88	4819911.5	931.17	20.73	663.7	31.12	0.36
2VOC	Building 2 VOC Abatement Device	568859.88	4819826	931.28	14.33	663.7	69.68	0.36
15VOC	Building 15 VOC Abatement Device	568897.31	4819658	932.53	14.02	663.7	139.36	0.36
24VOC	Building 24 VOC Abatement Device	569055	4819521	932.86	18.29	663.7	31.12	0.36
24CVOC	Building 24C VOC Abatement Device	569122	4819428.5	932.61	16.76	663.7	31.12	0.36
24DVOC	Building 24D VOC Abatement Device	569139	4819381.5	932.49	16.76	663.7	69.68	0.36
24EVOC	Building 24E VOC Abatement Device	569144.19	4819327	932.21	21.03	663.7	39.48	0.36
80VOC	Building 80 VOC Abatement Device	569862.38	4819788	934.68	26.21	663.7	23.23	0.36
SILO1	Silo 1	569062.88	4819711	933.14	19.81	0.0	1.77	0.49
SILO2	Silo 2	569062.88	4819705	933.12	19.81	0.0	1.77	0.49

[a] Universal transverse Mercator
[b] Meters
[c] Kelvin
[d] Meters per second
[e] Horizontal release for exhaust or the stack is equipped with a raincap

Table 10. VOLUME SOURCE EMISSION RELEASE PARAMETERS							
Release Point	**Source Description**	**X UTM[a] Coordinate (m)[b]**	**Y UTM Coordinate (m)**	**Source Base Elevation (m)**	**Release Height (m)**	**σ_{Z0}, Initial Lateral Dimension (m)**	**σ_{Y0}, Initial Vertical Dimension (m)**
22FUG1	Water Services Building 22 Fugitives	569054.88	4819676.5	933.268	5.03	8.65	4.68
22FUG2	Water Services Building 22 Fugitives	569092	4819676	933.338	5.03	8.65	4.68

[a.] Universal transverse Mercator
[b.] Meters

3.4 Results for Ambient Impact Analyses

3.4.1 Full Impact Analyses

A significant contribution analysis was not submitted for this application. Micron submitted a full impact analysis for the proposed PTC modification(s) and facility-wide emission cap PTC/Tier II permit project.

Results of DEQ's verification analyses and those presented by Micron are shown in Tables 11, 12, and 13. DEQ's results corresponded well with the ambient impacts presented by Micron. DEQ re-ran the modeling of the PM_{10} annual averaging period and SO_2 3-hour and 24-hour averaging periods, for the proportional scenario, which is the most likely scenario to occur. DEQ also conducted verification runs for the PM_{10} 24-hour averaging period for the single building and single stack scenarios.

Table 14 contains the results of Micron's analysis in support of the requested FEC limit for lead emissions of 0.06 tons per year (120 pounds per year). Lead, a criteria pollutant, was modeled using a Chi/Q approach as in the TAPs analysis. Micron determined that the same acid scrubber vent (16-FS-02) as used in the process emissions Chi/Q analysis for 24-hour and annual averaging periods caused the highest monthly average impacts. The Chi/Q value for lead was 5.49 $\mu g/m^3$, monthly average. The lead standard is a quarterly average. Micron has requested to use the monthly average value for the quarterly lead ambient standard, which is conservative.

Table 11. RESULTS OF FULL IMPACT ANALYSES – PROPORTIONAL SCENARIO						
Pollutant	**Averaging Period**	**Modeled Design Concentration[a] ($\mu g/m^3$)[c]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact[a] ($\mu g/m^3$)**	**NAAQS[d] ($\mu g/m^3$)**	**Percent of NAAQS**
PM_{10}[e]	24-hour	64	80	144	150	96%
	Annual	11 (10.96)	18	29	50	58%
SO_2[f]	3-hour	676 (676)[a] (620)[b]	42	718	1,300	55%
	24-hour	314 (317)[a] (292)[b]	26	340	365	93%
	Annual	2	8	10	80	13%
CO[g]	1-hour	1,671	12,200	13,871	40,000	35%
	8-hour	812	6,800	7,612	10,000	76%
NO_2[h]	Annual	36	40	76	100	76%

a. Values in parentheses were obtained from DEQ verification modeling. These values are the highest 1st high values, which Micron presented as a conservative design concentration for short-term averaging periods.

b. DEQ verification modeling using BPIP-PRIME/ISC3-PRIME design concentration for the 24-hr PM_{10} ambient standard used the highest 6th high impact. The design concentrations for the SO_2 3-hr avg and 24-hr avg design concentrations utilized the highest 2nd high values.

c. Micrograms per cubic meter

d. National ambient air quality standards

e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

f. Sulfur dioxide

g. Carbon monoxide

h. Nitrogen dioxide

Table 12. RESULTS OF FULL IMPACT ANALYSES – SINGLE STACK SCENARIO						
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[b]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact[a] ($\mu g/m^3$)**	**NAAQS[c] ($\mu g/m^3$)**	**Percent of NAAQS**
PM_{10}[d]	24-hour	69 (67.7)[a]	80	149	150	99%
	Annual	13	18	31	50	62%
SO_2[e]	3-hour	675	42	717	1,300	55%
	24-hour	313	26	339	365	93%
	Annual	2	8	10	80	13%
CO[f]	1-hour	1,618	12,200	13,818	40,000	35%
	8-hour	788	6,800	7,588	10,000	76%
NO_2[g]	Annual	39	40	79	100	79%

a. Values in parentheses were obtained from DEQ verification modeling using BPIP-PRIME/ISC3-PRIME. DEQ verification design concentration for the 24-hr PM_{10} ambient standard used the highest 6th high impact. This impact is attributed to the South Fab source group.

b. Micrograms per cubic meter

c. National ambient air quality standards

d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

e. Sulfur dioxide

f. Carbon monoxide

g. Nitrogen dioxide

Table 13. RESULTS OF FULL IMPACT ANALYSES – SINGLE BUILDING SCENARIO						
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[b]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact[a] ($\mu g/m^3$)**	**NAAQS[c] ($\mu g/m^3$)**	**Percent of NAAQS**
PM_{10}[d]	24-hour	59 (58.5)[a]	80	139	150	93%
	Annual	10	18	28	50	56%
SO_2[e]	3-hour	676	42	718	1,300	55%
	24-hour	314	26	340	365	93%
	Annual	2	8	10	80	13%
CO[f]	1-hour	1,736	12,200	13,936	40,000	35%
	8-hour	837	6,800	7,637	10,000	76%
NO_2[g]	Annual	32	40	72	100	72%

[a] Values in parentheses were obtained from DEQ verification modeling using BPIP-PRIME/ISC3-PRIME DEQ verification design concentration for the 24-hr PM_{10} ambient standard used the highest 6th high impact.
[b] Micrograms per cubic meter
[c] National ambient air quality standards
[d] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[e] Sulfur dioxide
[f] Carbon monoxide
[g] Nitrogen dioxide

Table 14. RESULTS OF LEAD IMPACT ANALYSES						
Pollutant	**Averaging Period**	**Modeled Design Concentration[a] ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact[a] ($\mu g/m^3$)**	**NAAQS[b] ($\mu g/m^3$)**	**Percent of NAAQS**
Pb[c]	Quarterly	0.08[d]	0.0 (0.03)[e]	0.08 (0.11)[e]	1.5	5% (7%)[e]

[a] Micrograms per cubic meter
[b] National ambient air quality standards
[c] Lead
[d] Lead impacts were conservatively modeled as a monthly average by Micron. The results are to evaluating the predicted ambient impact and the background concentration for a quarterly averaging period.
[e] Values in parentheses represent a statewide default lead background

The results of DEQ's verification analyses for selected pollutants for the NAAQS demonstration closely matched the values submitted by Micron.

3.4.2 TAPs Analyses

Table 15 lists the maximum predicted TAP ambient impacts for the new emissions related to the Operational Variability Component and the Proposed Growth Component allowed under the FEC Rules. DEQ did not re-run the Chi/Q analysis. The Chi/Q impact values were verified by reviewing the results summary submitted by Micron. Micron's documentation showed that both the 24-hour and annual Chi/Q impact values for future process ambient impact analyses were attributed to acid scrubber 16-FS-02 (acid scrubber No. 2 in building 16).

Micron's TAPs analyses did not discuss the combination of the impacts from process sources and the impacts from the boilers. Concurrent construction of process emissions units and boilers will be allowed by the PTC/Tier II FEC permit. Ambient impacts from the processes and boilers should be compared to the allowable TAP increment for any TAP emitted by both groups of sources. Formaldehyde is the only

TAP emitted by both process and boiler sources. DEQ's verification analysis conservatively assumed that the design concentration for each source group was at the same receptor, which is a conservative assumption. See Table 15 for the combined formaldehyde ambient impact.

Table 15. TOXIC AIR POLLUTANTS ANALYSIS RESULTS				
Pollutant	**Averaging Period**	**Maximum Concentration[a] ($\mu g/m^3$)[b]**	**AAC/AACC[c] ($\mu g/m^3$)**	**Percent of Limit[a]**
Non-Carcinogenic TAPs				
Silica –Quartz	24-hour	4.01	5	80%
Silica—Crystalline	24-hour	0.083	2.5	3.3%
Silica—Amorphous	24-hour	2.54	5	51%
Ammonia	24-hour	170.6	900	19%
Chlorine	24-hour	8.2	150	5.5%
1,2-Ethanediamine, N-(2-Aminoethyl)-	24-hour	10.3	200	5.2%
Hydrochloric Acid	24-hour	9.42	375	2.5%
Hydrofluoric Acid (Fluorides)	24-hour	12.0	125	9.6%
Hydrogen Bromide	24-hour	1.12	500	0.2%
Hydrogen Peroxide	24-hour	3.7	75	4.9%
Methylene Bisphenyl Isocyanate	24-hour	0.22	2.5	8.8%
Potassium Hydroxide	24-hour	11.95	100	12%
Sodium Hydroxide	24-hour	3.63	100	3.6%
Sodium Metabisulfate	24-hour	11.63	250	4.7%
Sulfuric Acid	24-hour	1.26	50	3.2%
Carcinogenic TAPs				
Chloroform	Annual	0.0017	0.043	4%
Formaldehyde	Annual	2.73E-02 (Boilers) 5.0E-03 (Process) (3.23E-02)[a]	0.077	35.5% (Boilers) 6.5% (Process) (42%)[a]
Arsenic	Annual	7.28E-05	2.3E-04	31.7%
Cadmium	Annual	4.0E-05	5.6E-04	7.1%
Chromium (+6)	Annual	9.17E-05	8.3E-05	110%
Nickel	Annual	7.64E-04	4.2E-03	18%

a. Values in parentheses are DEQ verification analysis results, highest 1st high for design concentrations and percentages for the percent of limit values. DEQ evaluated compliance by combining the formaldehyde impacts from the proposed increase in emissions from production processes and proposed boilers.

b Micrograms per cubic meter

c. Acceptable ambient concentration (noncarcinogens)/Acceptable ambient concentration for carcinogens

4.0 Conclusions

The ambient air impact analysis submitted, in combination with DEQ's verification analyses, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.

Appendix A

Modeled Emission Rates

Appendix A-1
Proportional Scenario

Appendix A-2
Single Building Scenario

Appendix A-3
Single Stack Scenario

APPENDIX A-1. FEC PROPORTIONAL SCENARIO

Appendix A-1. Table 1.-PROPORTIONAL SCENARIO POINT SOURCE PM_{10} EMISSION RATES			
Emission Source ID	**24-Hour Averaging Period (lb/hr)[a]**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**
NFFS01	0.238	0.238	1.043
NFFS02	0.238	0.238	1.044
NFFS03	0.238	0.238	1.044
NFFS04	0.238	0.238	1.044
NFFS05	0.238	0.238	1.044
NFFS06	0.238	0.238	1.044
NFVOC	0.015	0.015	0.067
NFBOI01	0.182	0.182	0.797
NFBOI02	0.182	0.182	0.797
NFBOI03	0.182	0.182	0.797
NFBOI04	0.182	0.182	0.797
NFGEN01	0.850	0.019	0.085
NFGEN02	0.850	0.019	0.085
SFFS01	0.238	0.238	1.044
SFFS02	0.238	0.238	1.044
SFFS03	0.238	0.238	1.044
SFFS04	0.238	0.238	1.044
SFFS05	0.238	0.238	1.044
SFFS06	0.238	0.238	1.044
SFVOC	0.015	0.015	0.067
SFBOI01	0.182	0.182	0.797
SFBOI02	0.182	0.182	0.797
SFBOI03	0.182	0.182	0.797
SFBOI04	0.182	0.182	0.797
SFGEN01	0.850	0.019	0.085
SFGEN02	0.850	0.019	0.085
25BOI10N	0.182	0.182	0.797
16GEN01N	0.850	0.019	0.085
24GEN02N	0.850	0.019	0.085
26GEN02N	0.849	0.019	0.085
36GEN03N	0.850	0.019	0.085
80GEN02N	0.850	0.019	0.085
26FS03N	0.000	0.000	0.000
JV2BOI1N	0.104	0.104	0.456
JV2GEN1N	0.850	0.019	0.085
JV2GEN2N	0.850	0.019	0.085
JV2FS01N	0.005	0.005	0.022
JV2VOCN	0.007	0.007	0.030
4BOI01	0.104	0.124	0.541
4BOI02	0.104	0.124	0.541
4BOI03	0.209	0.247	1.083
4BOI04	0.209	0.247	1.083
4BOI05	0.243	0.288	1.262

4BOI06	0.243	0.288	1.262
4BOI07	0.243	0.288	1.262
25BOI01	0.021	0.025	0.108
25BOI02	0.104	0.124	0.541
25BOI03	0.104	0.124	0.541
25BOI04	0.209	0.247	1.083
25BOI05	0.209	0.247	1.083
25BOI06	0.209	0.247	1.083
25BOI07	0.209	0.247	1.083
25BOI08	0.209	0.247	1.083
25BOI09	0.209	0.247	1.083
32BOI01	0.010	0.011	0.050
80BOI1	0.119	0.141	0.619
4COOL01	0.065	0.077	0.335
4COOL02	0.065	0.077	0.335
4COOL03	0.065	0.077	0.335
4COOL04	0.065	0.077	0.335
4COOL05	0.065	0.077	0.335
4COOL06	0.224	0.265	1.162
4COOL07	0.224	0.265	1.162
4COOL08	0.224	0.265	1.162
4COOL09	0.224	0.265	1.162
38COOL01	0.224	0.265	1.162
6COOL01	0.224	0.265	1.162
6COOL02	0.224	0.265	1.162
6COOL03	0.224	0.265	1.162
25COOL01	0.301	0.357	1.563
25COOL02	0.301	0.357	1.563
25COOL03	0.301	0.357	1.563
25COOL04	0.301	0.357	1.563
25COOL05	0.301	0.357	1.563
25COOL06	0.301	0.357	1.564
25COOL07	0.301	0.357	1.563
25COOL08	0.301	0.357	1.563
38COOL02	0.224	0.265	1.162
1GEN01	1.353	0.037	0.160
1XGEN01	1.353	0.037	0.160
4GEN01	0.688	0.019	0.082
10GEN01	0.860	0.023	0.102
15GEN01	0.883	0.024	0.105
17GEN01	0.688	0.019	0.082
17CGEN01	0.974	0.026	0.116
26GEN01	0.332	0.009	0.039
24GEN01	0.332	0.009	0.039
25GEN01	0.976	0.026	0.115
6GEN01	0.974	0.026	0.116
38GEN01	0.952	0.026	0.113
24DGEN02	0.974	0.026	0.116
24DGEN03	0.974	0.026	0.116
36GEN01	0.332	0.009	0.039
36GEN02	0.332	0.009	0.039

80GEN01	0.974	0.026	0.116
FWP2	1.215	0.033	0.144
1FS01	0.005	0.006	0.028
1FS02	0.005	0.006	0.028
1FS101	0.273	0.324	1.418
1FS102	0.273	0.324	1.418
1FS103	0.273	0.324	1.418
1AMS105	0.039[a]	0.046	0.203
4FS02	0.001	0.001	0.004
5FS01	0.001	0.001	0.005
5FS02	0.001	0.001	0.005
15FS01	0.207	0.246	1.077
15FS02	0.207	0.246	1.077
15FS03	0.210	0.248	1.088
15AMS05	0.068	0.081	0.355
16FS01	0.000	0.000	0.001
24AMS01	0.041	0.048	0.211
24AMS02	0.041	0.048	0.211
24FS03	0.041	0.048	0.211
24FS04	0.003	0.003	0.015
24FS05	0.003	0.003	0.015
24FS06	0.021	0.025	0.108
24FS07	0.021	0.025	0.108
24AMS08	0.034	0.040	0.176
24FS09	0.031	0.037	0.162
24AMS13	0.011	0.013	0.058
26FS01	0.000	0.000	0.000
24DAMS01	0.025	0.029	0.128
24DMPS01	0.010	0.012	0.051
24DFS01	0.045	0.053	0.231
24DFS02	0.045	0.053	0.231
24DFS03	0.045	0.053	0.231
80FS01	0.006	0.007	0.030
1XVOC	0.013	0.015	0.068
2VOC	0.017	0.021	0.090
15VOC	0.017	0.021	0.090
24VOC	0.013	0.015	0.068
24CVOC	0.007	0.008	0.034
24DVOC	0.017	0.021	0.090
24EVOC	0.013	0.015	0.068
80VOC	0.008	0.009	0.041
SILO1	0.007	0.008	0.036
SILO2	0.007	0.008	0.036

[a] Pounds per hour
[b] Tons per year

Appendix A-1, Table 2. PROPORTIONAL SCENARIO VOLUME SOURCE PM_{10} EMISSION RATES			
Emission Source ID	**24-Hour Averaging Period (lb/hr)[a]**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**

22FUG1	0.329	0.329	1.442
22FUG2	0.329	0.329	1.442

[a] Pounds per hour
[b] Tons per year

Appendix A-1, Table 3. PROPORTIONAL SCENARIO POINT SOURCE SO_2, CO, AND NO_2 EMISSION RATES							
	Sulfur Dioxide (SO_2)			Carbon Monoxide (CO)		Nitrogen Dioxide (NO_2)	
Emission Source ID	3-Hour and 24-Hour Averaging Periods (lb/hr)[a]	Annual Averaging Period (lb/hr)	Annual Averaging Period (T/yr)[b]	1-Hour and 8-Hour Averaging Periods (lb/hr)	Annual Emissions Modeled at Short-Term Emission Rates[c] (lb/hr)	Annual Averaging Period (lb/hr)	Annual Averaging Period (T/yr)[b]
NFVOC	1.4416	0.0011	0.0050	0.168	0.736	0.200	0.876
NFBOI01	1.4416	0.0143	0.0626	0.750	3.285	0.900	3.942
NFBOI02	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFBOI03	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFBOI04	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFGEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
NFGEN02	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
SFVOC	0.0011	0.0011	0.0050	0.168	0.736	0.200	0.876
SFBOI01	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFBOI02	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFBOI03	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFBOI04	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFGEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
SFGEN02	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
25BOI10N	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
16GEN01N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
24GEN02N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
26GEN02N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
36GEN03N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
80GEN02N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
JV2BOI1N	0.0069	0.0069	0.0300	0.960	4.205	1.143	5.006
JV2GEN1N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
JV2GEN2N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
JV2VOCN	0.0005	0.0005	0.0022	0.076	0.331	0.090	0.394
4BOI01	0.0072	0.0080	0.0349	1.006	4.408	1.120	4.904
4BOI02	0.0072	0.0080	0.0349	1.006	4.408	1.120	4.904
4BOI03	0.0143	0.0159	0.0695	2.013	8.816	2.242	9.818
4BOI04	0.0143	0.0159	0.0695	2.013	8.816	2.242	9.818
4BOI05	0.0167	0.0185	0.0812	2.350	10.293	2.613	11.445
4BOI06	0.0167	0.0185	0.0810	2.350	10.293	2.613	11.445
4BOI07	0.0143	0.0159	0.0695	0.790	3.462	1.115	4.882
25BOI01	0.0144	0.0159	0.0695	2.013	8.816	2.242	9.818
25BOI02	0.0072	0.0080	0.0349	1.006	4.408	1.120	4.904
25BOI03	0.0072	0.0080	0.0349	1.006	4.408	1.120	4.904
25BOI04	0.0143	0.0159	0.0695	2.013	8.816	2.242	9.818
25BOI05	0.0143	0.0159	0.0695	2.013	8.816	2.242	9.818
25BOI06	0.0143	0.0159	0.0695	0.790	3.462	1.115	4.882
25BOI07	0.0143	0.0159	0.0695	0.790	3.462	1.115	4.882
25BOI08	0.0144	0.0159	0.0695	0.790	3.462	1.115	4.882
25BOI09	0.0143	0.0159	0.0695	0.790	3.462	1.115	4.882

32BOI01	0.0006	0.0007	0.0031	0.095	0.415	0.136	0.597
80BOI1	0.0069	0.0076	0.0333	1.012	4.431	1.415	6.199
1GEN01	2.5271	0.0638	0.2796	6.523	28.572	0.939	4.114
1XGEN01	2.5271	0.0638	0.2796	6.523	28.572	0.939	4.114
4GEN01	7.4107	0.1872	0.8200	12.562	55.022	0.767	3.359
10GEN01	0.7020	0.0177	0.0777	2.382	10.432	0.296	1.295
15GEN01	5.8564	0.1480	0.6480	8.041	35.219	0.989	4.333
17GEN01	7.4107	0.1872	0.8200	12.562	55.022	0.767	3.359
17CGEN01	7.4107	0.1872	0.8200	12.562	55.022	0.920	4.031
26GEN01	2.3365	0.0590	0.2585	2.498	10.940	1.454	6.368
24GEN01	2.3365	0.0590	0.2585	2.498	10.940	1.454	6.368
25GEN01	7.4107	0.1872	0.8200	12.562	55.022	0.920	4.031
6GEN01	7.4107	0.1872	0.8200	12.562	55.022	0.920	4.031
38GEN01	0.6017	0.0152	0.0666	3.056	13.386	0.254	1.112
24DGEN02	7.4107	0.1872	0.8200	12.562	55.022	0.920	4.031
24DGEN03	7.4107	0.1872	0.8200	12.562	55.022	0.920	4.031
36GEN01	2.3365	0.0590	0.2585	2.498	10.940	1.454	6.368
36GEN02	2.3365	0.0590	0.2585	2.498	10.940	1.454	6.368
80GEN01	7.4107	0.1872	0.8200	12.562	55.022	0.920	4.031
FWP2	0.9928	0.0251	0.1099	3.383	14.817	0.419	1.837
1XVOC	0.0009	0.0010	0.0042	0.133	0.582	0.186	0.814
2VOC	0.0011	0.0013	0.0055	0.177	0.775	0.248	1.085
15VOC	0.0011	0.0013	0.0055	0.177	0.775	0.248	1.085
24VOC	0.0009	0.0009	0.0042	0.133	0.582	0.186	0.814
24CVOC	0.0004	0.0005	0.0021	0.066	0.291	0.093	0.407
24DVOC	0.0011	0.0013	0.0055	0.177	0.775	0.248	1.085
24EVOC	0.0009	0.0009	0.0042	0.133	0.582	0.186	0.814
80VOC	0.0005	0.0006	0.0025	0.080	0.349	0.111	0.488

[a] Pounds per hour
[b] Tons per year
[C] 1-hr and 8-hr short-term emission rate modeled at 8,760 hours per year

APPENDIX A-2. FEC SINGLE BUILDING SCENARIO

Appendix A-2. Table 1.-SINGLE BUILDING SCENARIO POINT SOURCE PM_{10} EMISSION RATES			
Emission Source ID	**24-Hour Averaging Period (lb/hr)[a]**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**
NFOPVAR	3.196	3.196	14.000
SFOPVAR	3.196	3.196	14.000
NFFS01	0.238	0.238	1.044
NFFS02	0.238	0.238	1.044
NFFS03	0.238	0.238	1.044
NFFS04	0.238	0.238	1.044
NFFS05	0.238	0.238	1.044
NFFS06	0.238	0.238	1.044
NFVOC	0.015	0.015	0.067
NFBOI01	0.182	0.182	0.797
NFBOI02	0.182	0.182	0.797
NFBOI03	0.182	0.182	0.797
NFBOI04	0.182	0.182	0.797
NFGEN01	0.850	0.019	0.085
NFGEN02	0.850	0.019	0.085
SFFS01	0.238	0.238	1.044
SFFS02	0.238	0.238	1.044
SFFS03	0.238	0.238	1.044
SFFS04	0.238	0.238	1.044
SFFS05	0.238	0.238	1.044
SFFS06	0.238	0.238	1.044
SFVOC	0.015	0.015	0.067
SFBOI01	0.182	0.182	0.797
SFBOI02	0.182	0.182	0.797
SFBOI03	0.182	0.182	0.797
SFBOI04	0.182	0.182	0.797
SFGEN01	0.850	0.019	0.085
SFGEN02	0.850	0.019	0.085
25BOI10N	0.182	0.182	0.797
16GEN01N	0.850	0.019	0.085
24GEN02N	0.850	0.019	0.085
26GEN02N	0.850	0.019	0.085
36GEN03N	0.850	0.019	0.085
80GEN02N	0.849	0.019	0.085
26FS03N	0.000	0.000	0.000
JV2BOI1N	0.104	0.104	0.456
JV2GEN1N	0.850	0.019	0.085
JV2GEN2N	0.850	0.019	0.085
JV2FS01N	0.005	0.005	0.022
JV2VOCN	0.007	0.007	0.030
4BOI01	0.091	0.091	0.398
4BOI02	0.091	0.091	0.398
4BOI03	0.182	0.182	0.797
4BOI04	0.182	0.182	0.797

4BOI05	0.212	0.212	0.929
4BOI06	0.212	0.212	0.929
4BOI07	0.212	0.212	0.929
25BOI01	0.018	0.018	0.080
25BOI02	0.091	0.091	0.398
25BOI03	0.091	0.091	0.398
25BOI04	0.182	0.182	0.797
25BOI05	0.182	0.182	0.797
25BOI06	0.182	0.182	0.797
25BOI07	0.182	0.182	0.797
25BOI08	0.182	0.182	0.797
25BOI09	0.182	0.182	0.797
32BOI01	0.008	0.008	0.037
80BOI1	0.104	0.104	0.456
4COOL01	0.056	0.056	0.247
4COOL02	0.056	0.056	0.247
4COOL03	0.056	0.056	0.247
4COOL04	0.056	0.056	0.247
4COOL05	0.056	0.056	0.247
4COOL06	0.195	0.195	0.855
4COOL07	0.195	0.195	0.855
4COOL08	0.195	0.195	0.855
4COOL09	0.195	0.195	0.855
38COOL01	0.195	0.195	0.855
6COOL01	0.195	0.195	0.855
6COOL02	0.195	0.195	0.855
6COOL03	0.195	0.195	0.855
25COOL01	0.263	0.263	1.150
25COOL02	0.263	0.263	1.150
25COOL03	0.263	0.263	1.150
25COOL04	0.263	0.263	1.150
25COOL05	0.263	0.263	1.150
25COOL06	0.263	0.263	1.150
25COOL07	0.263	0.263	1.150
25COOL08	0.263	0.263	1.150
38COOL02	0.195	0.195	0.855
1GEN01	1.180	0.027	0.118
1XGEN01	1.180	0.027	0.118
4GEN01	0.600	0.014	0.060
10GEN01	0.750	0.017	0.075
15GEN01	0.770	0.018	0.077
17GEN01	0.600	0.014	0.060
17CGEN01	0.850	0.019	0.085
26GEN01	0.290	0.007	0.029
24GEN01	0.290	0.007	0.029
25GEN01	0.850	0.019	0.085
6GEN01	0.850	0.019	0.085
38GEN01	0.830	0.019	0.083
24DGEN02	0.850	0.019	0.085
24DGEN03	0.850	0.019	0.085
36GEN01	0.290	0.007	0.029

36GEN02	0.290	0.007	0.029
80GEN01	0.850	0.019	0.085
FWP2	1.060	0.024	0.106
1FS01	0.005	0.005	0.021
1FS02	0.005	0.005	0.021
1FS101	0.238	0.238	1.044
1FS102	0.238	0.238	1.044
1FS103	0.238	0.238	1.044
1AMS105	0.034	0.034	0.149
4FS01	0.000	0.000	0.000
4FS02	0.001	0.001	0.003
5FS01	0.001	0.001	0.003
5FS02	0.001	0.001	0.003
15FS01	0.181	0.181	0.792
15FS02	0.181	0.181	0.792
15FS03	0.183	0.183	0.800
15AMS05	0.060	0.060	0.261
15AMS06	0.000	0.000	0.000
16FS01	0.000	0.000	0.000
24AMS01	0.035	0.035	0.155
24AMS02	0.035	0.035	0.155
24FS03	0.035	0.035	0.155
24FS04	0.003	0.003	0.011
24FS05	0.003	0.003	0.011
24FS06	0.018	0.018	0.079
24FS07	0.018	0.018	0.079
24AMS08	0.030	0.030	0.130
24FS09	0.027	0.027	0.119
24AMS13	0.010	0.010	0.042
26FS01	0.041	0.041	0.180
24DAMS01	0.022	0.022	0.094
24DMPS01	0.009	0.009	0.038
24DFS01	0.039	0.039	0.170
24DFS02	0.039	0.039	0.170
24DFS03	0.039	0.039	0.170
80FS01	0.005	0.005	0.022
1XVOC	0.011	0.011	0.050
2VOC	0.015	0.015	0.067
15VOC	0.015	0.015	0.067
24VOC	0.011	0.011	0.050
24CVOC	0.006	0.006	0.025
24DVOC	0.015	0.015	0.067
24EVOC	0.011	0.011	0.050
80VOC	0.007	0.007	0.030
SILO1	0.006	0.006	0.026
SILO2	0.006	0.006	0.026

[a] Pounds per hour
[b] Tons per year

Appendix A-2, Table 2. SINGLE BUILDING SCENARIO VOLUME SOURCE PM_{10} EMISSION RATES			
Emission Source ID	**24-Hour Averaging Period (lb/hr)[a]**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**
22FUG1	0.287	0.287	1.258
22FUG2	0.287	0.287	1.258

[a] Pounds per hour
[b] Tons per year

Appendix A-2, Table 3. SINGLE BUILDING SCENARIO POINT SOURCE SO_2, CO, AND NO_2 EMISSION RATES							
	Sulfur Dioxide (SO_2)			**Carbon Monoxide (CO)**		**Nitrogen Dioxide (NO_2)**	
Emission Source ID	**3-Hour and 24-Hour Averaging Periods (lb/hr)[a]**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**	**1-Hour and 8-Hour Averaging Periods (lb/hr)**	**Annual Emissions Modeled at Short-Term Emission Rates[c] (lb/hr)**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**
NFOPVAR	0.228	0.228	1.000	8.448	37.000	8.904	39.000
SFOPVAR	0.228	0.228	1.000	8.448	37.000	8.904	39.000
NFVOC	0.001	0.001	0.005	0.168	0.736	0.200	0.876
NFBOI01	0.014	0.014	0.063	0.750	3.285	0.900	3.942
NFBOI02	0.014	0.014	0.063	0.750	3.285	0.900	3.942
NFBOI03	0.014	0.014	0.063	0.750	3.285	0.900	3.942
NFBOI04	0.014	0.014	0.063	0.750	3.285	0.900	3.942
NFGEN01	7.390	0.169	0.739	11.920	52.210	0.743	3.255
NFGEN02	7.390	0.169	0.739	11.920	52.210	0.743	3.255
SFVOC	0.001	0.001	0.005	0.168	0.736	0.200	0.876
SFBOI01	0.014	0.014	0.063	0.750	3.285	0.900	3.942
SFBOI02	0.014	0.014	0.063	0.750	3.285	0.900	3.942
SFBOI03	0.014	0.014	0.063	0.750	3.285	0.900	3.942
SFBOI04	0.014	0.014	0.063	0.750	3.285	0.900	3.942
SFGEN01	7.390	0.169	0.739	11.920	52.210	0.743	3.255
SFGEN02	7.390	0.169	0.739	11.920	52.210	0.743	3.255
25BOI10N	0.014	0.014	0.063	0.750	3.285	0.900	3.942
16GEN01N	7.390	0.169	0.739	11.920	52.210	0.743	3.255
24GEN02N	7.390	0.169	0.739	11.920	52.210	0.743	3.255
26GEN02N	7.390	0.169	0.739	11.920	52.210	0.743	3.255
36GEN03N	7.390	0.169	0.739	11.920	52.210	0.743	3.255
80GEN02N	7.389	0.169	0.740	11.920	52.210	0.743	3.255
JV2BOI1N	0.007	0.007	0.030	0.960	4.205	1.143	5.006
JV2GEN1N	7.390	0.169	0.739	11.920	52.210	0.743	3.255
JV2GEN2N	7.390	0.169	0.739	11.920	52.210	0.743	3.255
JV2VOCN	0.001	0.001	0.002	0.076	0.331	0.090	0.394
4BOI01	0.007	0.007	0.031	0.955	4.183	0.904	3.960
4BOI02	0.007	0.007	0.031	0.955	4.183	0.904	3.960

4BOI03	0.014	0.014	0.063	1.910	8.366	1.810	7.928
4BOI04	0.014	0.014	0.063	1.910	8.366	1.810	7.928
4BOI05	0.017	0.017	0.073	2.230	9.767	2.110	9.242
4BOI06	0.017	0.017	0.073	2.230	9.767	2.110	9.242
4BOI07	0.014	0.014	0.063	0.750	3.285	0.900	3.942
25BOI01	0.014	0.014	0.063	1.910	8.366	1.810	7.928
25BOI02	0.007	0.007	0.031	0.955	4.183	0.904	3.960
25BOI03	0.007	0.007	0.031	0.955	4.183	0.904	3.960
25BOI04	0.014	0.014	0.063	1.910	8.366	1.810	7.928
25BOI05	0.014	0.014	0.063	1.910	8.366	1.810	7.928
25BOI06	0.014	0.014	0.063	0.750	3.285	0.900	3.942
25BOI07	0.014	0.014	0.063	0.750	3.285	0.900	3.942
25BOI08	0.014	0.014	0.063	0.750	3.285	0.900	3.942
25BOI09	0.014	0.014	0.063	0.750	3.285	0.900	3.942
32BOI01	0.001	0.001	0.003	0.090	0.394	0.110	0.482
80BOI1	0.007	0.007	0.030	0.960	4.205	1.143	5.006
1GEN01	2.520	0.058	0.252	6.190	27.112	0.758	3.322
1XGEN01	2.520	0.058	0.252	6.190	27.112	0.758	3.322
4GEN01	7.390	0.169	0.739	11.920	52.210	0.619	2.712
10GEN01	0.700	0.016	0.070	2.260	9.899	0.239	1.046
15GEN01	5.840	0.133	0.584	7.630	33.420	0.799	3.499
17GEN01	7.390	0.169	0.739	11.920	52.210	0.619	2.712
17CGEN01	7.390	0.169	0.739	11.920	52.210	0.743	3.255
26GEN01	2.330	0.053	0.233	2.370	10.381	1.174	5.142
24GEN01	2.330	0.053	0.233	2.370	10.381	1.174	5.142
25GEN01	7.390	0.169	0.739	11.920	52.210	0.743	3.255
6GEN01	7.390	0.169	0.739	11.920	52.210	0.743	3.255
38GEN01	0.600	0.014	0.060	2.900	12.702	0.205	0.898
24DGEN02	7.390	0.169	0.739	11.920	52.210	0.743	3.255
24DGEN03	7.390	0.169	0.739	11.920	52.210	0.743	3.255
36GEN01	2.330	0.053	0.233	2.370	10.381	1.174	5.142
36GEN02	2.330	0.053	0.233	2.370	10.381	1.174	5.142
80GEN01	7.390	0.169	0.739	11.920	52.210	0.743	3.255
FWP2	0.990	0.023	0.099	3.210	14.060	0.339	1.483
1XVOC	0.001	0.001	0.004	0.126	0.552	0.150	0.657
2VOC	0.001	0.001	0.005	0.168	0.736	0.200	0.876
15VOC	0.001	0.001	0.005	0.168	0.736	0.200	0.876
24VOC	0.001	0.001	0.004	0.126	0.552	0.150	0.657
24CVOC	0.000	0.000	0.002	0.063	0.276	0.075	0.329
24DVOC	0.001	0.001	0.005	0.168	0.736	0.200	0.876
24EVOC	0.001	0.001	0.004	0.126	0.552	0.150	0.657
80VOC	0.001	0.001	0.002	0.076	0.331	0.090	0.394

[a] Pounds per hour
[b] Tons per year
[C] 1-hr and 8-hr short-term emission rate modeled at 8,760 hours per year

APPENDIX A-3. FEC SINGLE STACK SCENARIO

Appendix A-3. Table 1.-SINGLE STACK SCENARIO POINT SOURCE PM_{10} EMISSION RATES			
Emission Source ID	**24-Hour Averaging Period (lb/hr)[a]**	**Annual Averaging Period (lb/hr)**	**Annual Averaging Period (T/yr)[b]**
OPERVARI	3.196	3.196	14.000
NFFS01	0.238	0.238	1.044
NFFS02	0.238	0.238	1.044
NFFS03	0.238	0.238	1.044
NFFS04	0.238	0.238	1.044
NFFS05	0.238	0.238	1.044
NFFS06	0.238	0.238	1.044
NFVOC	0.015	0.015	0.067
NFBOI01	0.182	0.182	0.797
NFBOI02	0.182	0.182	0.797
NFBOI03	0.182	0.182	0.797
NFBOI04	0.182	0.182	0.797
NFGEN01	0.850	0.019	0.085
NFGEN02	0.850	0.019	0.085
SFFS01	0.238	0.238	1.044
SFFS02	0.238	0.238	1.044
SFFS03	0.238	0.238	1.044
SFFS04	0.238	0.238	1.044
SFFS05	0.238	0.238	1.044
SFFS06	0.238	0.238	1.044
SFVOC	0.015	0.015	0.067
SFBOI01	0.182	0.182	0.797
SFBOI02	0.182	0.182	0.797
SFBOI03	0.182	0.182	0.797
SFBOI04	0.182	0.182	0.797
SFGEN01	0.850	0.019	0.085
SFGEN02	0.850	0.019	0.085
25BOI10N	0.182	0.182	0.797
16GEN01N	0.850	0.019	0.085
24GEN02N	0.849	0.019	0.085
26GEN02N	0.849	0.019	0.085
36GEN03N	0.849	0.019	0.085
80GEN02N	0.850	0.019	0.085
26FS03N	0.000	0.000	0.000
JV2BOI1N	0.104	0.104	0.456
JV2GEN1N	0.850	0.019	0.085
JV2GEN2N	0.850	0.019	0.085
JV2FS01N	0.005	0.005	0.022
JV2VOCN	0.007	0.007	0.030
4BOI01	0.091	0.091	0.398
4BOI02	0.091	0.091	0.398
4BOI03	0.182	0.182	0.797
4BOI04	0.182	0.182	0.797
4BOI05	0.212	0.212	0.929

4BOI06	0.212	0.212	0.929
4BOI07	0.212	0.212	0.929
25BOI01	0.018	0.018	0.080
25BOI02	0.091	0.091	0.398
25BOI03	0.091	0.091	0.398
25BOI04	0.182	0.182	0.797
25BOI05	0.182	0.182	0.797
25BOI06	0.182	0.182	0.797
25BOI07	0.182	0.182	0.797
25BOI08	0.182	0.182	0.797
25BOI09	0.182	0.182	0.797
32BOI01	0.008	0.008	0.037
80BOI1	0.104	0.104	0.456
4COOL01	0.056	0.056	0.247
4COOL02	0.056	0.056	0.247
4COOL03	0.056	0.056	0.247
4COOL04	0.056	0.056	0.247
4COOL05	0.056	0.056	0.246
4COOL06	0.195	0.195	0.855
4COOL07	0.195	0.195	0.855
4COOL08	0.195	0.195	0.855
4COOL09	0.195	0.195	0.855
38COOL01	0.195	0.195	0.855
6COOL01	0.195	0.195	0.855
6COOL02	0.195	0.195	0.855
6COOL03	0.195	0.195	0.855
25COOL01	0.263	0.263	1.150
25COOL02	0.263	0.263	1.150
25COOL03	0.263	0.263	1.150
25COOL04	0.263	0.263	1.150
25COOL05	0.263	0.263	1.150
25COOL06	0.263	0.263	1.150
25COOL07	0.263	0.263	1.150
25COOL08	0.263	0.263	1.150
38COOL02	0.195	0.195	0.855
1GEN01	1.180	0.027	0.118
1XGEN01	1.183	0.027	0.118
4GEN01	0.600	0.014	0.060
10GEN01	0.750	0.017	0.075
15GEN01	0.770	0.018	0.077
17GEN01	0.600	0.014	0.060
17CGEN01	0.850	0.019	0.085
26GEN01	0.290	0.007	0.029
24GEN01	0.290	0.007	0.029
25GEN01	0.850	0.019	0.085
6GEN01	0.850	0.019	0.085
38GEN01	0.833	0.019	0.083
24DGEN02	0.849	0.019	0.085
24DGEN03	0.850	0.019	0.085
36GEN01	0.290	0.007	0.029
36GEN02	0.290	0.007	0.029

80GEN01	0.850	0.019	0.085
FWP2	1.064	0.024	0.106
1FS01	0.005	0.005	0.021
1FS02	0.005	0.005	0.021
1FS101	0.238	0.238	1.044
1FS102	0.238	0.238	1.043
1FS103	0.238	0.238	1.044
1FS104	0.000	0.000	0.000
1AMS105	0.034	0.034	0.149
3GBFS01	0.000	0.000	0.000
4FS01	0.000	0.000	0.000
4FS02	0.001	0.001	0.003
5FS01	0.001	0.001	0.003
5FS02	0.001	0.001	0.003
15FS01	0.181	0.181	0.792
15FS02	0.181	0.181	0.792
15FS03	0.183	0.183	0.800
15AMS05	0.060	0.060	0.261
16FS01	0.000	0.000	0.000
24AMS01	0.035	0.035	0.155
24AMS02	0.035	0.035	0.155
24FS03	0.035	0.035	0.155
24FS04	0.003	0.003	0.011
24FS05	0.003	0.003	0.011
24FS06	0.018	0.018	0.079
24FS07	0.018	0.018	0.079
24AMS08	0.030	0.030	0.130
24FS09	0.027	0.027	0.119
24FS10	0.000	0.000	0.000
24AMS13	0.010	0.010	0.042
26FS01	0.041	0.041	0.180
24DAMS01	0.022	0.022	0.094
24DMPS01	0.009	0.009	0.038
24DFS01	0.039	0.039	0.170
24DFS02	0.039	0.039	0.170
24DFS03	0.039	0.039	0.170
80FS01	0.005	0.005	0.022
1XVOC	0.011	0.011	0.050
2VOC	0.015	0.015	0.067
15VOC	0.015	0.015	0.067
24VOC	0.011	0.011	0.050
24CVOC	0.006	0.006	0.025
24DVOC	0.015	0.015	0.067
24EVOC	0.011	0.011	0.050
80VOC	0.007	0.007	0.030
SILO1	0.006	0.006	0.026
SILO2	0.006	0.006	0.026

[a] Pounds per hour
[b] Tons per year

Appendix A-3, Table 2. SINGLE STACK SCENARIO VOLUME SOURCE PM_{10} EMISSION RATES			
Emission Source ID	24-Hour Averaging Period (lb/hr)[a]	Annual Averaging Period (lb/hr)	Annual Averaging Period (T/yr)[b]
22FUG1	0.287	0.287	1.258
22FUG2	0.287	0.287	1.258

[a] Pounds per hour
[b] Tons per year

Appendix A-3, Table 3. SINGLE STACK SCENARIO POINT SOURCE SO_2, CO, AND NO_2 EMISSION RATES							
	Sulfur Dioxide (SO_2)			Carbon Monoxide (CO)		Nitrogen Dioxide (NO_2)	
Emission Source ID	3-Hour and 24-Hour Averaging Periods (lb/hr)[a]	Annual Averaging Period (lb/hr)	Annual Averaging Period (T/yr)[b]	1-Hour and 8-Hour Averaging Periods (lb/hr)	Annual Emissions Modeled at Short-Term Emission Rates[c] (lb/hr)	Annual Averaging Period (lb/hr)	Annual Averaging Period (T/yr)[b]
OPERVARI	0.2283	0.2283	1.0000	8.448	37.000	8.904	39.000
NFVOC	0.0011	0.0011	0.0050	0.168	0.736	0.200	0.876
NFBOI01	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFBOI02	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFBOI03	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFBOI04	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
NFGEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
NFGEN02	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
SFVOC	0.0011	0.0011	0.0050	0.168	0.736	0.200	0.876
SFBOI01	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFBOI02	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFBOI03	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFBOI04	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
SFGEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
SFGEN02	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
25BOI10N	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
16GEN01N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
24GEN02N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
26GEN02N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
36GEN03N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
80GEN02N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
JV2BOI1N	0.0069	0.0069	0.0300	0.960	4.205	1.143	5.006
JV2GEN1N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
JV2GEN2N	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
JV2VOCN	0.0005	0.0005	0.0022	0.076	0.331	0.090	0.394
4BOI01	0.0072	0.0072	0.0314	0.955	4.183	0.904	3.960
4BOI02	0.0072	0.0072	0.0314	0.955	4.183	0.904	3.960
4BOI03	0.0143	0.0143	0.0626	1.910	8.366	1.810	7.928
4BOI04	0.0143	0.0143	0.0626	1.910	8.366	1.810	7.928

4BOI05	0.0167	0.0167	0.0731	2.230	9.767	2.110	9.242
4BOI06	0.0167	0.0167	0.0731	2.230	9.767	2.110	9.242
4BOI07	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
25BOI01	0.0143	0.0143	0.0626	1.910	8.366	1.810	7.928
25BOI02	0.0072	0.0072	0.0314	0.955	4.183	0.904	3.960
25BOI03	0.0072	0.0072	0.0314	0.955	4.183	0.904	3.960
25BOI04	0.0143	0.0143	0.0626	1.910	8.366	1.810	7.928
25BOI05	0.0143	0.0143	0.0626	1.910	8.366	1.810	7.928
25BOI06	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
25BOI07	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
25BOI08	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
25BOI09	0.0143	0.0143	0.0626	0.750	3.285	0.900	3.942
32BOI01	0.0006	0.0006	0.0028	0.090	0.394	0.110	0.482
80BOI1	0.0069	0.0069	0.0300	0.960	4.205	1.143	5.006
1GEN01	2.5200	0.0575	0.2520	6.190	27.112	0.758	3.322
1XGEN01	2.5200	0.0575	0.2520	6.190	27.112	0.758	3.322
4GEN01	7.3901	0.1687	0.7390	11.920	52.210	0.619	2.712
10GEN01	0.7000	0.0160	0.0700	2.260	9.899	0.239	1.046
15GEN01	5.8401	0.1333	0.5840	7.630	33.420	0.799	3.499
17GEN01	7.3901	0.1687	0.7390	11.920	52.210	0.619	2.712
17CGEN01	7.3890	0.1691	0.7404	11.920	52.210	0.743	3.255
26GEN01	2.3300	0.0532	0.2330	2.370	10.381	1.174	5.142
24GEN01	2.3334	0.0532	0.2329	2.370	10.381	1.174	5.142
25GEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
6GEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
38GEN01	0.6000	0.0137	0.0600	2.900	12.702	0.205	0.898
24DGEN02	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
24DGEN03	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
36GEN01	2.3300	0.0532	0.2330	2.370	10.381	1.174	5.142
36GEN02	2.3300	0.0532	0.2330	2.370	10.381	1.174	5.142
80GEN01	7.3901	0.1687	0.7390	11.920	52.210	0.743	3.255
FWP2	0.9900	0.0226	0.0990	3.210	14.060	0.339	1.483
1XVOC	0.0009	0.0009	0.0038	0.126	0.552	0.150	0.657
2VOC	0.0011	0.0011	0.0050	0.168	0.736	0.200	0.876
15VOC	0.0011	0.0011	0.0050	0.168	0.736	0.200	0.876
24VOC	0.0009	0.0009	0.0037	0.126	0.552	0.150	0.657
24CVOC	0.0004	0.0004	0.0019	0.063	0.276	0.075	0.329
24DVOC	0.0011	0.0011	0.0050	0.168	0.736	0.200	0.876
24EVOC	0.0009	0.0009	0.0037	0.126	0.552	0.150	0.657
80VOC	0.0005	0.0005	0.0022	0.076	0.331	0.090	0.394

[a] Pounds per hour
[b] Tons per year
[C] 1-hr and 8-hr short-term emission rate modeled at 8,760 hours per year

Appendix F

Response to Draft Permit Comments

T2-060033

Comment 1) - Close Consent Order

MTI requests that DEQ add language to the permit confirming closure of the consent order.

Response: *DEQ changed the language in Permit Condition 1.2 to confirm that the consent order will terminated upon issuance of the Tier II operating permit.*

Comment 2) - Delete References to Photronics' Mask Fabrication Facility

This comment is being submitted as agreed upon in a meeting on July 17, 2007 attended by you, Mike Simon, DEQ, Dustin Holloway, Micron Technology, Inc. (MTI), Beth Elroy, MTI, and Sara Browne, Photronics Inc. As discussed during the meeting, the new mask manufacturing project referenced in MTI's June, 2006 submittals of the Tier I Operating Permit Renewal Application and Tier II Operating Permit Application Update has matured. Photronics has operational control of the facility.

As discussed, Photronics is an independent company with its own Board of Directors, Responsible Official, and environmental engineer to ensure environmental compliance. The new mask facility, is a de minimis source exempt from the requirement to obtain a permit to construct per IDAPA 58.01.01.220. The MTI site is also a minor source under the Federal NSR program regardless of whether the new mask facility's potential emissions are included in the determination or not. Accordingly, we reached consensus that this site should be regulated independently from the Tier I and Tier II permits.

MTI requests that all references to the new Photronics facility be removed from MTI's pending Tier II Operating Permit and associated documents, as well as the pending Tier I Operating Permit Renewal Application. All future correspondence regarding Photronics should be made as follows:

Sara Browne, Environmental Engineer
Photronics, Inc.
10136 S. Federal Way
Boise, ID 83716

Rudy Beckstrom, Responsible Official
Photronics, Inc.
10136 S. Federal Way
Boise, ID 83716

Response: *DEQ acknowledges the independence of Photronics from MTI as provided above. Reference to Photronics or the new mask facility will not be included in the permit or statement of basis.*

Comment 3) Comment on MTI's Application Under Appendix G

Although not reflected in the draft permit or associated documents, MTI identified a typographical error in its permit application under Appendix G. Under the proposed growth component MTI included a row titled "New Mask (includes boilers and generators)". This row should have been titled "Miscellaneous facility changes including potential new mask shop". The purpose of this portion of the growth component was to allow for miscellaneous additions and modifications to the MTI facility that could occur regardless of whether a new Fab was constructed or not. As stated in Comment 2, MTI requests that all references to the new mask shop be removed from the permit. However, MTI does not wish to change the growth component of the FEC, as it was intended to represent miscellaneous changes on the existing site that were not accounted for in the New Fab portion of the growth component. This comment is intended to clarify the permit application and associated DEQ records. MTI requests no changes to the draft permit or associated documents as a result of this comment.

Response: *Comment acknowledged.*

Comment 4) Modify VOC Abatement Unit Performance Test

MTI requests that the VOC abatement performance tests be modified as seen in the attached "track changes" version of the draft permit. MTI requests that the performance test be modified from a HAP performance test to a total VOC performance test. MTI's HAP emissions are primarily associated with acid gas emissions (HCl and HF). While MTI identified 2-(2-Butoxyethoxy) ethanol as a significant HAP emission in 2004 (see appendix B of the tech statement of basis), this calculation was extremely conservative. MTI assumed that all of the chemical used in one particular wet process area was emitted to the atmosphere without considering waste collected or pollution control equipment in its calculation. Upon further investigation, MTI determined that the area in question should have been calculated the same as other wet process areas by using an estimated evaporation rate of 10%. Therefore, the resulting uncontrolled emissions for 2004 would be approximately 0.75 T/yr. See attached updated HAPs sheet.

Additionally, since 2004, usage of 2-(2-Butoxyethoxy) ethanol has declined significantly. See following summary.

2-(2-Butoxyethoxy) ethanol usage summary
2004 13,600 lbs
2005 5,200 lbs
2006 2,600 lbs

Due to the low usage of 2-(2-Butoxyethoxy) ethanol it is not reasonable for MTI to test organic HAP removal from VOC abatement units as currently written in the permit. MTI proposes to modify the testing requirement to account for total VOC destruction.

Response: *DEQ changed the abatement unit test requirement as requested. The permit now requires measuring total VOC emissions at the inlet and outlet of a VOC abatement unit to determine destruction efficiency and mass emissions rate of VOCs.*

Comment 5) Remove VOC Abatement Unit PM10 Test

MTI requests that the particulate test on the VOC abatement unit be removed from the permit. VOC abatement units are high temperature thermal oxidizers (1,350 °F or greater in the oxidizer chamber) that operate on natural gas, limiting potential particulate emissions. VOC abatement unit PM10 emissions are estimated to be approximately 0.015 lb/hr per unit and represent a small portion of MTI's requested PM10 FEC (Approximately 0.5 T/yr of the 59 T/yr in the permit).

Response: *DEQ concurs that testing a VOC abatement unit for particulate matter emissions is not necessary because the estimated emissions are a very small contributor of total PM from the facility. DEQ originally put the test requirement in the facility-draft permit using the logic that a test was needed to verify the emission rate used in the modeling analysis. However, because estimated particulate emissions are so low it would not be an effective use of resources.*

Comment 6) Include Language in Permit to Allow Modifications Under FEC Rules

MTI requests that the permit include language that clearly allows facility expansion under the facility emissions cap rule at IDAPA 58.01.01.175-181, as further defined in the Tier II permit, without triggering the alternative applicability determinations or permit modification rules at IDAPA 58.01.01.200-228. See MTI's comments in the "track changes" document attached.

Response: *DEQ incorporated MTI's proposed language for the permit. The Facility Emissions Cap section of the permit now says:*

“This permit authorizes changes to the facility which increase emissions of criteria pollutants and HAPs for those changes that comply with the terms and conditions of this permit and that meet the requirements of IDAPA 58.01.01.181. The procedures in IDAPA 58.01.01.220-222 are not applicable to changes in design or equipment at the facility that result in any change in the nature or amount of emissions provided that MTI complies with the conditions of Sections 3 and 5 of this permit and meets the requirements of IDAPA 58.01.01.181.”

Comment 7) NSPS Boiler Alternative Fuel Monitoring

MTI requests to record fuel usage once per month for NSPS boilers as allowed under the recent revisions to 40 CFR Subpart Dc. See 40 CFR 60.48c(g)(2).

Response: *DEQ has revised the boiler fuel monitoring schedule to monthly as allowed by the revised 40 CFR 60, Subpart Dc.*

Comment 8) Scrubber Liquid Flow Rate Monitoring

MTI requests to monitor scrubbing liquid flow rate once per month rather than daily. MTI does not have electronic flow measuring devices in place on all scrubbers and manually checking flow produces an unnecessary resource burden on MTI. Scrubbing liquid flow rate changes slowly with time as a result of scrubbing nozzles slowly building up scale. Due to the relatively slow changing nature of the scrubber liquid flow rates, monthly monitoring is sufficient to adequately provide MTI time to perform maintenance on units without the risk of the flow rates dropping below the minimum flow rates that will be included in the scrubber monitoring log.

Response: *DEQ and MTI discussed scrubber monitoring during an August 21, 2007 meeting to discuss MTI’s comments on the draft permit. During the meeting DEQ explained the need to have monitoring data that demonstrates the scrubbers are working adequately on a more frequent basis than monthly. DEQ suggested that there could be other parameters that MTI is can record, or is currently recording, that would provide the demonstration of scrubber operation. On October 12, 2007, MTI submitted additional comments on the draft permit and proposed monitoring the scrubber pump on/off status or presence of liquid flow using a sensor. DEQ revised the permit to require monitoring and recording the scrubbers operational status (on/off status or presence of liquid flow) of the scrubbing water recirculation pumps at least once every 15-minutes. The scrubber liquid flow rate monitoring was then reduced to a monthly frequency.*

Comment 9) Responsible Official

MTI requests that Dale Eldridge, Director of Facilities, be listed on the permit as the responsible official.

Response: *The responsible official was changed to Dale Eldridge, Director of Facilities.*

Comment 10) Miscellaneous

MTI has provided miscellaneous language changes within the permit to help clarify the meaning of the permit term and assure that it is consistent with MTI's operations and business practices. If you have any questions regarding a change that was not specifically addressed in this email please contact us for more information.

Response: *DEQ reviewed the proposed language changes and accepted many.*

On the first page of the permit under Permit Authority, DEQ accepted the proposed changes to the permit authority text that includes references to the FEC rules (IDAPA 58.01.01.175-181) and allows changes to the facility that are done in compliance with the FEC rules.

The list of equipment (including scrubbers, VOC abatement units, boilers, cooling towers, and emergency generators) was removed from the permit as requested because the list may change as MTI adds or removes equipment as allowed under the FEC conditions. The list now resides in an appendix of the statement of basis so that a DEQ inspector will be able to easily locate the list.

DEQ included a reference to the New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines, 40 CFR 60 Subpart IIII, within the emergency generator section of the permit, as prompted by MTI.

DEQ did not accept the proposed language changes to General Provisions 1 and 3 because DEQ believes they were redundant.

Comment 11) Meeting With DEQ to Discuss Comments
MTI would like to meet with DEQ staff to review comments. During this time MTI would also like to take this opportunity to review the emissions calculation methodology and ensure DEQ understands MTI's approach and systems.

Response: *DEQ met with MTI on August 21, 2007. DEQ was represented by Mike Simon, Zach Klotovich, and Lisa Kronberg from the Attorney General's office. MTI was represented by Dustin Holloway, Beth Elroy, and MTI's legal council Demi Fisher.*